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NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/13  
NATIONAL DAM SAFETY PROGRAM. OATKA CREEK DAM (NY 435), GENESEE --ETC(U)  
SEP 79 J B STETSON

DACW51-79-C-0001

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GENESEE RIVER BASIN

OATKA CREEK DAM

GENESEE COUNTY  
NEW YORK

INVENTORY NO NY 435

10 John B. Stetson

6 PHASE I INSPECTION REPORT  
NATIONAL DAM SAFETY PROGRAM

Oatka Creek Dam (NY 435), Genesee  
River Basin, Genesee County, New York.  
Phase I Inspection Report

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NEW YORK DISTRICT CORPS OF ENGINEERS

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## REPORT DOCUMENTATION PAGE

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1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Phase I Inspection Report Oatka Creek Dam Genesee River Basin, Genesee County, New York Inventory No. 435		5. TYPE OF REPORT & PERIOD COVERED Phase I Inspection Report National Dam Safety Program
7. AUTHOR(s) John B. Stetson, P.E.		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Stetson-Dale Engineering Company Bankers Trust Building Utica, New York 13501		8. CONTRACT OR GRANT NUMBER(s) DACW-51-79-C-0001
11. CONTROLLING OFFICE NAME AND ADDRESS New York State Department of Environmental Conservation/ 50 Wolf Road Albany, New York 12233		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) Department of the Army 26 Federal Plaza/ New York District, CofE New York, New York 10007		12. REPORT DATE 28 September 1979
		13. NUMBER OF PAGES
		15. SECURITY CLASS. (of this report) UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; Distribution unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES ORIGINAL CONTAINS COLOR PLATES: ALL DDC REPRODUCTIONS WILL BE IN BLACK AND WHITE.		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Dam Safety National Dam Safety Program Visual Inspection Hydrology, Structural Stability Oatka Creek Dam Genesee County Le Roy		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. The examination of documents and visual inspection of the dam and appurtenant structures did not reveal conditions which constitute an immediate hazard to human life or property. The dam, however, has a number of problem areas, which if not remedied, have the potential for developing into hazardous conditions.		

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The structural stability analysis indicates that the dam is unstable during normal operating conditions including ice load but retains stability without the ice load acting.

Computations prepared according to the Recommended Guidelines for Safety Inspection of Dams establish the spillway capacity as 9,665 cfs. This capacity is 13 percent of the Probable Maximum Flood discharge and 28 percent of the 1/2 Probable Maximum Flood discharge. The PMF and 1/2 PMF are 71,500 cfs and 34,500 cfs respectively. The spillway is inadequate to pass the 1/2 PMF without overtopping of the dam. The Route 5 highway bridge, just downstream from the dam, restricts flow so that the backwater effect of the restriction causes submergence of the dam to occur at flows of 4,700 cfs, much lower than the top of dam capacity of 9,665 cfs. It follows, therefore, that the 1/2 PMF flow would cause submergence of the dam. Therefore, conditions do not exist at the dam site from which a dam break would occur during the 1/2 PMF event. Therefore, the dam is not considered to have a seriously inadequate spillway according to the Corps of Engineers' screening criteria.

The visual inspection and screening analysis revealed deficiencies which require the following actions:

- (1) A structural stability analysis of the dam should be conducted to determine the effect of the dam's steel bar anchor system and the uplift forces acting at the base of the dam. The investigation should extend to the inspection of the dam's upstream face and evaluation of the condition of the concrete in the dam's upstream zone. Plans for repair should include rehabilitation and repair of concrete joints in areas where minor deterioration has occurred.
- (2) The bridge opening channel capacity should be investigated to determine the capacity of the dam/bridge combination and a determination should be made as to whether the existing discharge capacity of these structures provides adequate protection to the facility and adjoining properties.
- (3) Trash racks should be installed upstream from the sluice gates.
- (4) Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of the reservoir drain system. Document this information for future reference.
- (5) Develop an emergency action plan.

These investigations should be undertaken immediately and completed within one year. The necessary remedial work should be completed within two years of notification.



## PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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PHASE I REPORT  
NATIONAL DAM SAFETY PROGRAM

Name of Dam Oatka Creek Dam, NY435  
State Located New York  
County Located Genesee  
Stream Oatka Creek  
Date of Inspection August 9, 1979

ASSESSMENT OF  
GENERAL CONDITIONS

The examination of documents and visual inspection of the dam and appurtenant structures did not reveal conditions which constitute an immediate hazard to human life or property. The dam, however, has a number of problem areas, which if not remedied, have the potential for developing into hazardous conditions.

The structural stability analysis indicates that the dam is unstable during normal operating conditions including ice load but retains stability without the ice load acting.

Computations prepared according to the Recommended Guidelines for Safety Inspection of Dams establish the spillway capacity as 9,665 cfs. This capacity is 13 percent of the Probable Maximum Flood discharge and 28 percent of the 1/2 Probable Maximum Flood discharge. The PMF and 1/2 PMF are 71,500 cfs and 34,500 cfs respectively. The spillway is inadequate to pass the 1/2 PMF without overtopping of the dam. The Route 5 highway bridge, just downstream from the dam, restricts flow so that the backwater effect of the restriction causes submergence of the dam to occur at flows of 4,700 cfs, much lower than the top of dam capacity of 9,665 cfs. It follows, therefore, that the 1/2 PMF flow would cause submergence of the dam. Therefore, conditions do not exist at the dam site from which a dam break would occur during the 1/2 PMF event. Therefore, the dam is not considered to have a seriously inadequate spillway according to the Corps of Engineers' screening criteria.

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3. Trash racks should be installed upstream from the sluice gates.
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5. Develop an emergency action plan.

These investigations should be undertaken immediately and completed within one year. The necessary remedial work should be completed within two years of notification.

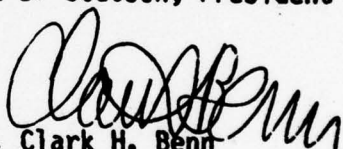
Dale Engineering Company

  
John B. Stetson, President

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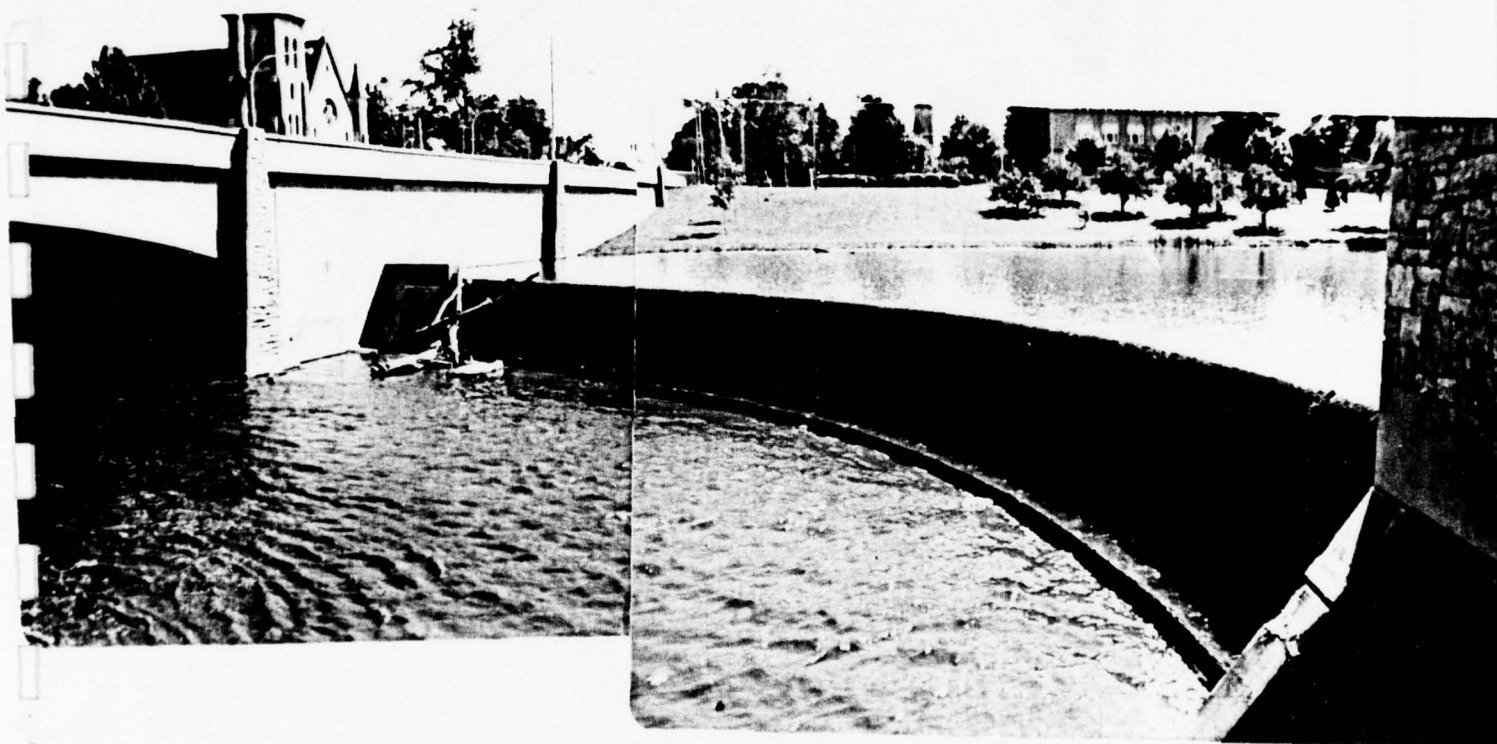
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*28 Sept 79*

  
Col. Clark H. Benn  
New York District Engineer

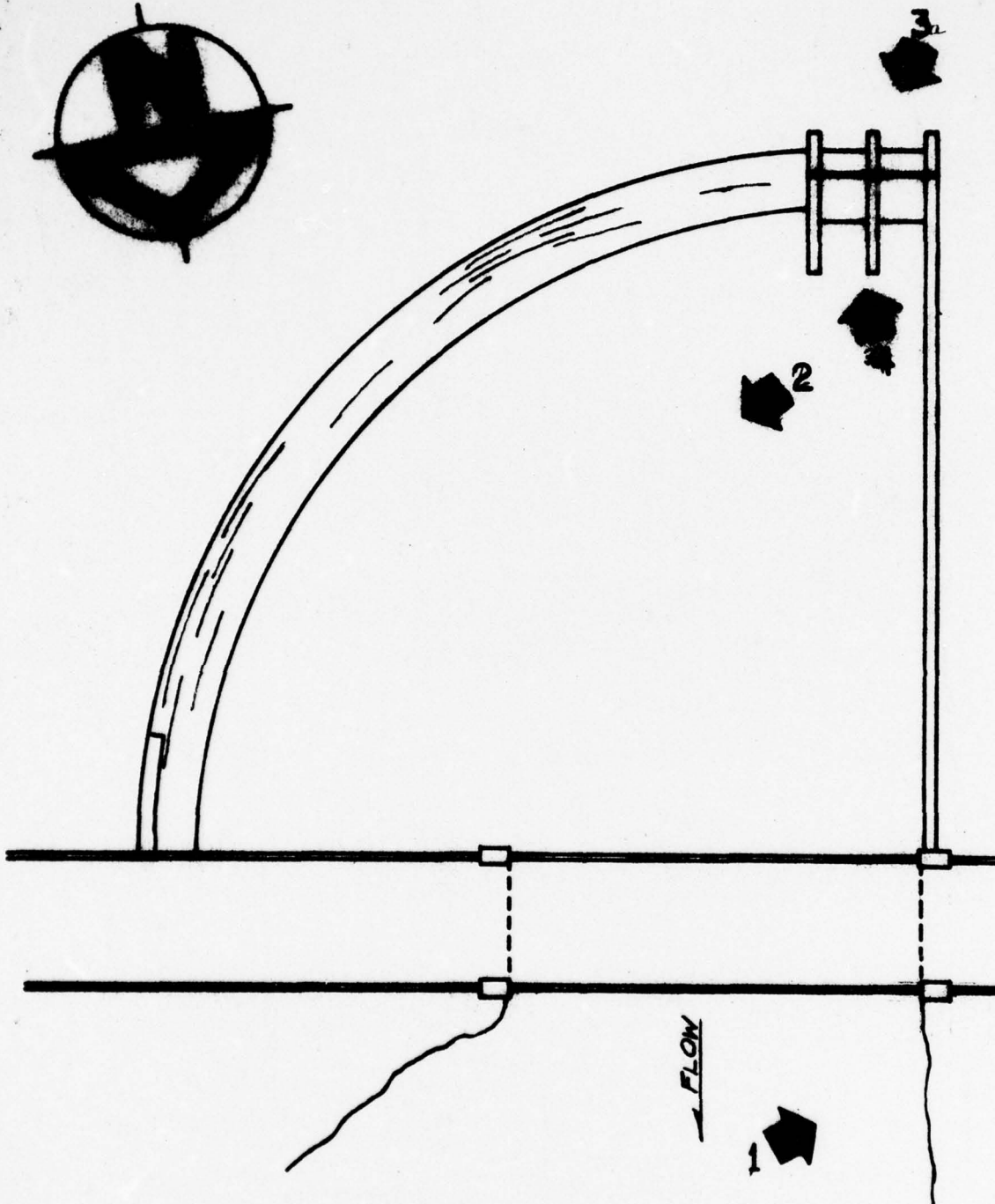
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Overview of Oatka Creek Dam in LeRoy, New York. The bridge and far dam abutment has recently been reconstructed.





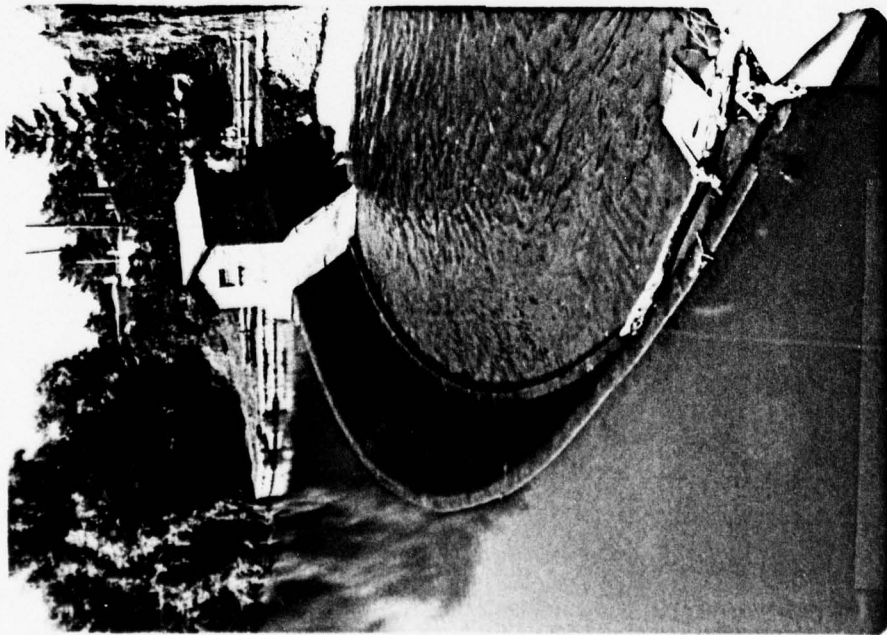
## PHOTOGRAPHIC KEY MAP

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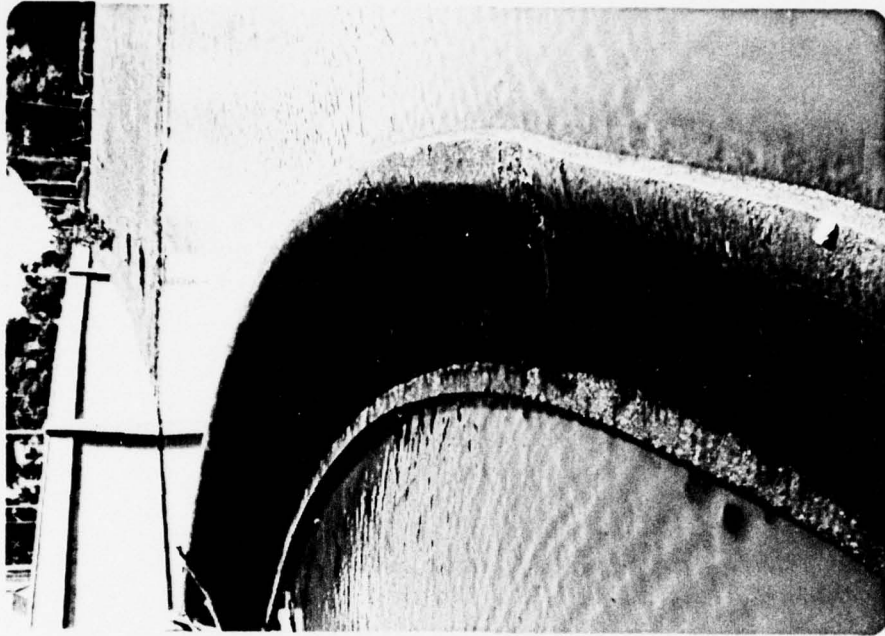
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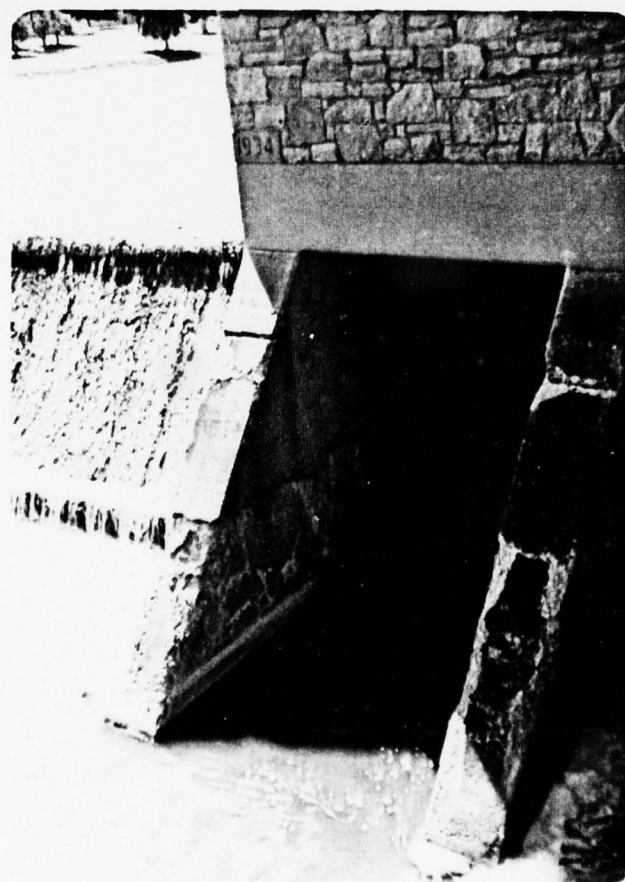
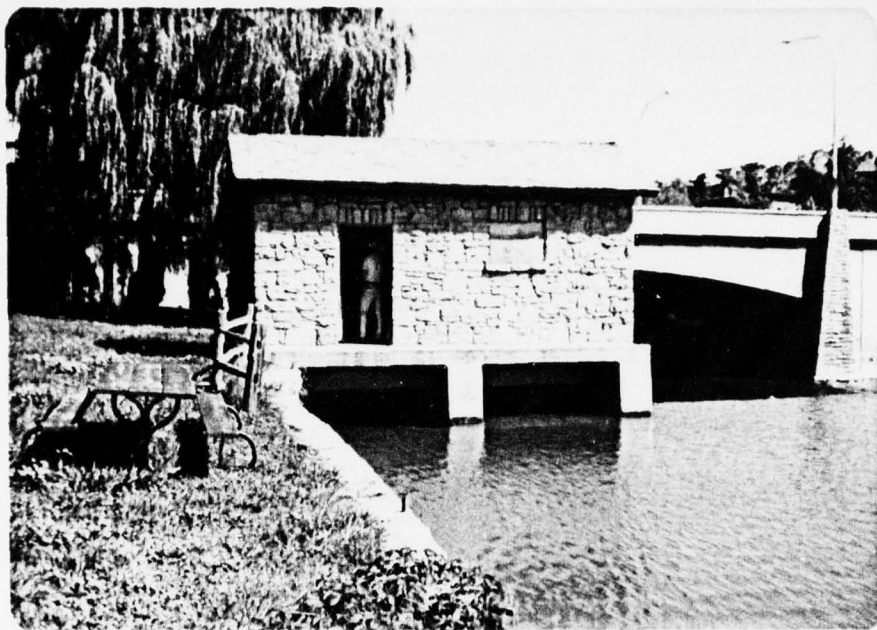
OATKA CREEK  
DAM



1. View of dam from bridge. Two sluice gates are located in the gatehouse in the far abutment.



2. Close-up picture shows spillway concrete surface is in good condition.



3. Upstream view of gatehouse and close-up of gatehouse walls.

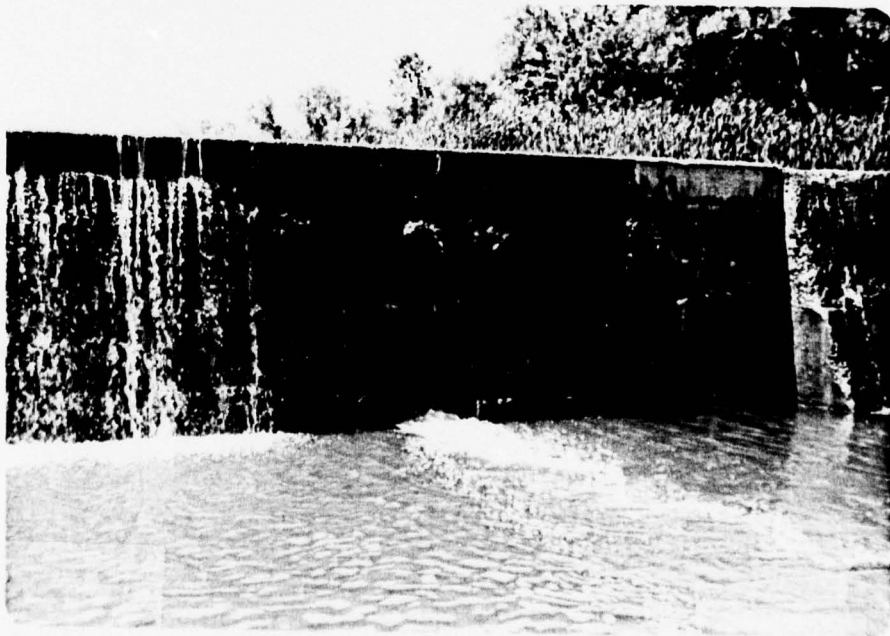


4. Hydraulic equipment located in gatehouse operates the two sluice gates.





5. Overview of another dam located one mile upstream.



6. This upstream dam has a concrete cap over a timber leveling layer atop stone masonry units. Considerable flow is occurring through the structure. Several masonry units are missing at the base of the dam in the center area of this picture. The reservoir has a large amount of sediment in it.



7. Downstream hazard is a residential neighborhood located 6-8 feet above normal flow elevation.

PHASE I INSPECTION REPORT  
NATIONAL DAM SAFETY PROGRAM  
NAME OF DAM - OATKA CREEK DAM ID# - NY 435

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

a. Authority

Authority for this report is provided by the National Dam Inspection Act, Public Law 92-367 of 1972. It has been prepared in accordance with a contract for professional services between Dale Engineering Company and The New York State Department of Environmental Conservation.

b. Purpose of Inspection

The purpose of this inspection is to evaluate the existing condition of the Oatka Creek Dam and appurtenant structures, owned by the Village of LeRoy, New York, and to determine if the dam constitutes a hazard to human life or property and to transmit findings to the State of New York.

This Phase I inspection report does not relieve an Owner or Operator of a dam of the legal duties, obligations or liabilities associated with the ownership or operation of the dam. In addition, due to the limited scope of services for these Phase I investigations, the investigators had to rely upon the data furnished to them. Therefore, this investigation is limited to visual inspection, review of data prepared by others, and simplified hydrologic, hydraulic and structural stability evaluations where appropriate. The investigators do not assume responsibility for defects or deficiencies in the dam or in the data provided.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances

The Oatka Creek Dam is located in the Village of LeRoy, immediately upstream from the Route 5 bridge in the center of the Village. The dam is a crescent shaped spillway structure approximately 15 feet high and 196 feet long. The spillway is a concrete ogee crested spillway structure. The west abutment of the dam terminates at a control gate structure which is located on the west bank of Oatka Creek. The dam curves in a downstream direction so that its southerly abutment is located as a part of the Route 5 highway bridge. This makes the south abutment in a line parallel to the flow of the creek. The gatehouse contains two wooden sluice gate structures 8 feet wide by 8 feet high. These wooden sluice gates are operated by hydraulic pistons which are powered by an electrically driven hydraulic pump. The gatehouse is a stone masonry structure on a concrete foundation. The plans indicate that this structure is founded on bedrock.



b. Location

The Oatka Creek Dam is located in the Village of LeRoy, Town of LeRoy, Genesee County, New York.

c. Size Classification

The maximum height of the dam is approximately 15 feet. The storage volume of the impoundment is approximately 230 acre feet. Therefore, the dam is in the small size classification as defined by the Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification

Oatka Creek flows through the Village of LeRoy. Residential development has taken place along the banks of the creek. Therefore, the dam is in the High Hazard Category as defined by the Recommended Guidelines for Safety Inspection of Dams.

e. Ownership

The dam is owned by the Village of LeRoy, New York.

Contact: Kermit Arrington  
Public Works Director, Village of LeRoy  
3 West Main Street  
LeRoy, New York 14482  
Telephone: 716-768-6350 Village Hall  
716-768-8566 DPW Garage

f. Purpose of the Dam

The dam is used to create a pond near the center of the village for aesthetic and environmental purposes in addition to emergency water supply for fire protection. No recreational use is presently made of the impoundment.

g. Design and Construction History

The construction plans included in this report indicate that the dam was designed in 1934. Construction is assumed to have taken place shortly after that time. The north abutment of the dam was recently reconstructed during the modification of the Route 5 highway bridge. This reconstruction shortened the length of the spillway by approximately 10 feet by converting that section to a non-overflow section.

h. Normal Operational Procedures

The facility is operated by the Village of LeRoy, Department of Public Works. The sluice gates are used to control the water level in the impoundment.



### 1.3 PERTINENT DATA

#### a. Drainage Area

The drainage area of Oatka Creek Dam is 140.13 square miles.

#### b. Discharge at Dam Site

No discharge records are available for this site.

Computed discharges:

Dam Submergence	4700 cfs
Ungated spillway, top of dam	9660 cfs
Ungated spillway	34525 cfs 1/2 PMF
Gated drawdown	Not Calculated

#### c. Elevation (Feet Above MSL)

Top of dam	870
Maximum pool - Design discharge	879.7 1/2 PMF
Spillway crest	864
Stream bed at centerline of dam	856

#### d. Reservoir

Length of maximum pool	4500 ft (1/2 PMF)
Length of normal pool	4500 ft

#### e. Storage

Top of dam	470+ acre feet
Normal pool	230+ acre feet

#### f. Reservoir Area

Top of dam	40+ acre
Spillway pool	40+ acre

#### g. Dam

Type - Crested concrete, gravity.  
Length - 196 feet  
Height - 15 feet  
Freeboard between normal reservoir and top of dam - 6 feet  
Top width - N/A  
Side slopes - N/A  
Zoning - N/A  
Impervious core - N/A  
Grout curtain - N/A

h. Spillway

Type - Ogee crest

Length - 160 feet

Crest elevation - 864

Gates - None

U/S channel - Natural

D/S channel - Natural bedrock stream bed

i. Regulating Outlets

Sluice gates 2 - 8 feet x 8 feet wooden sluice gates.

## SECTION 2 - ENGINEERING DATA

### 2.1 DESIGN

The information available for the evaluation of this dam has been included in this report. The information consisting of contract drawings is contained in Figures 2 and 3. No information regarding the design of the dam was available.

### 2.2 CONSTRUCTION

No details were available regarding the construction of this dam other than the construction drawings which are included in the report.

### 2.3 OPERATION

No Operation Manual is known to exist for this structure.

### 2.4 EVALUATION

The data included in this report is not adequate for a detailed investigation of the dam; however, the information is sufficient for a Phase I investigation.



### SECTION 3 - VISUAL INSPECTION

#### 3.1 FINDINGS

##### a. General

The Oatka Creek Dam was inspected on August 9, 1979. The Dale Engineering Company Inspection Team was accompanied on the inspection by Kermit Arrington of the Village LeRoy, Department of Public Works.

##### b. Dam

At the time of the inspection, the water in the impoundment was drawn down through the manipulation of the sluice gate to allow an inspection of the spillway surface. Some minor cracking near the crest of the spillway was noted in this visual inspection. This situation was minor and would not effect the structural stability of the facility. There was some minor deterioration along horizontal joints of the dam and some minor deterioration along the vertical joints between the monoliths. Visual observation did not disclose physical displacement of the alignment of the structure and the facility appears to be structurally stable.

##### c. Appurtenant Structures

The north abutment of the dam forms a part of the Route 5 highway bridge which crosses Oatka Creek immediately downstream from the dam. This abutment has recently been reconstructed and appears to be in good condition. The west abutment of the dam terminates in a masonry wall which forms the west bank of Oatka Creek. The masonry is in generally good condition. There is some displacement of the upper masonry units probably due to frost action, but the displacement is minor and does not appear to effect the stability of the bank of the stream.

##### d. Control Outlet

The outlet of the impoundment is controlled by the manipulation of wooden sluice gates in the control structure at the west end of the spillway. These sluice gates are operated by hydraulic pistons powered by an electric pump. The sluice gates were operated at the time of the inspection. During the operation of the sluice gates, some floatable material became lodged in the sluice gate opening and prevented closure of the gate. There were no trash racks to prevent the entrance of floatable material into the gate structure.

## SECTION 3 - VISUAL INSPECTION

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e. Reservoir Area

The reservoir area extends approximately 4500 feet upstream to another small dam which was formerly used to provide a recreational pond. The area behind this upstream dam is presently heavily silted in and the dam is in poor condition. See Photograph No. 5 and 6.

f. Downstream Channel

The downstream channel is formed in bedrock and no evidence of recent erosion was noted in the channel.

3.2 EVALUATION

The visual inspection revealed that the dam is generally in good condition with only minor deterioration of the concrete surfaces. The sluice gate structure is in operating condition and was generally in good structural condition. Some minor deterioration has taken place on the concrete walls which form the sluice gate openings. The absence of trash racks in front of the sluice gates allows floatable material to lodge in the openings and prevent closure of the gates. Some means of preventing this condition should be provided. No deformation of the alignment of any of the structures was noted in the visual inspection.



## SECTION 4 - OPERATIONAL PROCEDURES

### 4.1 PROCEDURES

The normal operating procedure for this structure is to maintain the water level in the impoundment in the center of the village for aesthetic and environmental purposes. The sluice gates are used to regulate the level of this impoundment.

### 4.2 MAINTENANCE OF THE DAM

Maintenance and operation of the dam is controlled by the Village of LeRoy, Department of Public Works. Periodic visits are made to the site to check on the conditions of the facilities. No formal warning system is in effect.

### 4.3 MAINTENANCE OF OPERATING FACILITIES

The gates controlling the flow are presently in operating condition and are checked periodically by the Department of Public Works.

### 4.4 DESCRIPTION OF WARNING SYSTEMS

No warning system is in effect at present.

### 4.5 EVALUATION

The dam and appurtenances are inspected at regular intervals by the Village of LeRoy, Department of Public Works. The facilities are generally in good working condition and there is no evidence of deterioration caused by lack of maintenance.

## SECTION 5 - HYDROLOGIC/HYDRAULIC

### 5.1 DRAINAGE AREA CHARACTERISTICS

The Oatka Creek Dam, located in the Village of LeRoy immediately above the Route 5 bridge, has 140 square miles of drainage area. Oatka Creek starts in Central Wyoming County and runs north into Genesee County, a distance of 25 miles to the dam site. The upland terrain is composed of the large rolling hillsides and valleys found in the Finger Lakes Region. Some valley sections along the creek are a mile in width and are very flat.

### 5.2 ANALYSIS CRITERIA

The purpose of this investigation is to evaluate the dam and spillway with respect to their flood control potential and adequacy. This has been assessed through the evaluation of the Probable Maximum Flood (PMF) for watershed and the subsequent routing of the flood through the reservoir and the dam's spillway system. The PMF event is that hypothetical flow produced by the most critical combination of precipitation, minimum infiltration loss and concentration run-off of a specific location that is considered reasonably possible for a particular drainage area. Since the dam is in the Small Dam Category and is a High Hazard, the Recommended Guidelines for Safety Inspection of Dams (Ref. 1) require that the dam be capable of passing one-half the Probable Maximum Flood.

The hydrologic analysis was performed using the unit hydrograph method to develop the flood hydrograph. Due to the limited scope of this Phase I investigation, certain assumptions, based on experience and existing data were used in this analysis and in the determination of the dam's spillway capacity to pass the PMF. In the event that the dam could not pass the 1/2 Probable Maximum Flood without overtopping, an additional analysis is to be performed on potential dam failure if the dam is designated as a High Hazard Classification. This process was done with the concept that, if the dam was unable to satisfy this criteria, further refined hydrologic investigations would be required.

The U.S. Army Corps of Engineers' Hydrologic Engineering Center's Computer Program HEC-1 DB using the Modified Puls Method of flood routing was used to evaluate the dam, spillway capacity, and downstream hazard.

Unit hydrographs were defined by Snyder coefficients,  $T_p$  and  $C_p$ . The drainage area was divided into sub-areas according to the slope of the terrain. Run-off, routing and flood hydrograph combining was then performed as inflow to the reservoir.

The Probable Maximum Precipitation (PMP) was 21 inches according to Hydrometeorological Report (HMR #33) for a 24-hour duration, 200

square mile basin, while loss rates were set at 1.0 inches initial abstraction and 0.1 inches/hour continuous loss rate. The loss rate function yielded 82.5 percent run-off from the PMF.

### 5.3 SPILLWAY CAPACITY

The spillway is a weir type structure 160 feet in length. The spillway coefficient varied between 3.47 and 4.15 for the spillway rating curve development. Immediately below the weir, flows discharge through a 70 x 12 foot bridge opening. The overall discharge capability of the spillway at the top of dam elevation is 9665 cfs.

#### SPILLWAY CAPACITY WITHOUT BRIDGE BELOW DAM

	<u>Discharge</u>	<u>Capacity as % of PMF</u>
PMF	71,500 cfs	13%
1/2 PMF	34,500 cfs	28%

The Route 5 bridge immediately below the spillway governs flow conditions for most significant floods. The dam becomes submerged for floods above 4700 cfs which corresponds to 9 feet of head over the spillway. For all depths up to submergence, the tailwater rises faster than the headwater over the dam. For flows above 13,000 cfs, the bridge is also overtopped.

Therefore, according to this analysis, the most critical loading flood condition on the dam exists when the headwaters are at normal operating elevations.

### 5.4 RESERVOIR CAPACITY

The reservoir storage capacity is given below. This was estimated for USGS mapping.

Top of Dam	310 Acre Feet
Crest of Spillway	230 Acre Feet

### 5.5 FLOODS OF RECORD

There is no information on water levels at the dam site.

### 5.6 OVERTOPPING POTENTIAL

The HEC-1 DB analysis indicates that the dam will be overtopped as follows:

#### OVERTOPPING IN FEET WITHOUT BRIDGE BELOW DAM

PMF	23.4 Feet
1/2 PMF	13.7 Feet

The dam becomes submerged at 4,700 cfs, as previously stated.



## 5.7 EVALUATION

The HEC-1 DB modeling for this 140 square mile drainage area computed PMF and 1/2 PMF values which appear excessive. A detailed computer analysis would be required to assess the upland run-off and routing characteristic of the flat valley areas. This analysis is not within the scope of this investigation. The Route 5 bridge just downstream from the dam restricts flow so that the backwater effect of the restriction causes submergence of the dam to occur at flows of 4700 cfs, much lower than the top of dam spillway capacity of 9665 cfs. It follows, therefore, that the 1/2 PMF flow would cause submergence of the dam.

Conditions do not exist at the dam site from which a dam break would occur during a 1/2 PMF event. Therefore, the dam is not considered to have a seriously inadequate spillway according to the Corps of Engineers' screening criteria.

It is recommended that the bridge opening channel capacity be evaluated to determine whether it meets standards.

## SECTION 6 - STRUCTURAL STABILITY

### 6.1 EVALUATION OF STRUCTURAL STABILITY

#### a. Visual Observations

This dam is a concrete structure having a curved alignment. Its right abutment (viewed looking downstream) is formed where the dam meets a concrete viaduct which is part of the creek overpass for Highway Route 5, immediately downstream from the dam. The width of the underbridge flow channel is less than the length of the dam. A gate house structure, located on the westerly bank of the creek, forms the dam's left abutment. For the inspection, the upstream water level was drawn down to permit better evaluation of the dam alignment and downstream face. Observations at that time indicate the dam retains stability with no signs of structural displacement.

The dam's concrete is generally in good condition, but minor surface deterioration is occurring. What appears to be minor deterioration of the concrete at the location of some horizontal and vertical construction joints has also resulted. A small amount of leakage occurs at one location because of a small crack or open joint near the crest of the dam.

Minor deterioration of the concrete in various sections of the gate structure has occurred but no structural problems are indicated. The masonry land wall forming the westerly limit of the creek in the vicinity of the gate house is in good condition.

Because of the downstream water, the downstream creek bed could not be inspected for erosion or signs of underdam seepage.

#### b. Geology and Seismic Stability

The Village of LeRoy is located within the Southern Ontario Plain which is part of the Eastern Lake Section of the Central Lowland Province. Both the dam and spillway are sited on bedrock of the Skaneateles Formation of Middle Devonian Age. The rock grades range from grayish calcareous shale to shaley limestone. Bedding is close to horizontal with a dip of less than 1 degree to the south. According to the 1934 State Report, the bedrock, after removal of all earth and soil, was to be excavated and keyed to a minimum depth of 12 inches and a width of at least 11 feet. One inch round steel bar dowels were to be grouted in holes drilled in the rock trench and the foundation concrete tied to the dowels. During excavation, no porous seams or fissures were seen in the rock. No mention of rock grouting was made. Neither the right nor left abutments are set in bedrock, but in clay and building foundations.

Several subsurface faults, based on drill hole data, are located within 10 miles west of the dam site (see geologic map included). These faults are branches of the Clarendon-Linden Fault. The LeRoy area is in a Zone 2 Designation on the Seismic Probability Map.

The New York Geological Survey records indicate significant earthquake activity in this area. Although most activity has been of low intensity, some has been of moderate intensity as shown below:

<u>Date</u>	<u>Intensity Modified Mercalli</u>	<u>Location Relative to Dam</u>
1969	IV	12 mi. SW
1967	VI	12 mi. SW
1966	VI	17 mi. SW
1965, July	V	12 mi. SW
1965, Aug.	IV	12 mi. SW
1955	V	17 mi. SW
1929, Dec. 3	IV	20 mi. SW
1929, Dec. 2	IV	20 mi. SW
1929, Aug. 12	VIII	20 mi. SW

Many earthquakes of lesser intensity have occurred in the area, closer to the dam than those listed above. One of these occurred in 1972, three miles west of the dam.

c. Data Review and Stability Evaluation

Design drawings available for review show plan layout and cross-sections for the various structural elements of the facility but do not include information on the properties of the dam and foundation materials nor stability analysis. As part of the present study, stability evaluations have been performed for the dam/spillway sections. Actual properties of the dam's construction materials and foundations were not determined as part of this study; where information on properties were necessary for computations but lacking, assumptions felt to be practical were made. These stability computations assumed a dam cross-section based on dimensions indicated by the plans included in this report. The analysis also assumed the dam section to be a monolith possessing necessary internal resistance to shear and bending occurring as a result of loading. It should be considered that in areas where deterioration has occurred the section dimensions would be less than indicated by the plans, with some adverse effect on the structural strength expected.

The results of the stability computations are summarized in the table below. Analyses have been performed for the normal operations case only; hydrologic studies indicate the dam will be submerged under 1/2 PMF and PMF conditions, because of the restriction to flow developed by the Highway Route 5 Bridge immediately downstream of the dam. The normal operations case is considered as imposing a combination of forces most critical to the stability of the dam. The stability analyses are included in Appendix D.



# RESULTS OF STABILITY COMPUTATIONS

<u>Loading Condition</u>	<u>Factor of Safety*</u> <u>Overturning</u>	<u>Sliding**</u>	<u>Location of Resultant</u> <u>Passing through Base***</u>
(I) Water elevations at normal operating levels, uplift on base plus 7.5 kip per lineal foot ice load acting.	0.62 <sub>+</sub>	15 <sub>+</sub>	Outside of Base
(II) Water elevations at normal operating levels and normal uplift on base	1.7 <sub>+</sub>	50 <sub>+</sub>	0.4b

\*These factors of safety indicate the ratio of moments causing overturning to those moments resisting, and the ratio of forces causing sliding to those resisting.

\*\*As determined applying the friction-shear method.

\*\*\*Indicated in terms of the dam's base dimension, b, measured from the toe of the dam.

The analysis indicates unsatisfactory stability against overturning for the dam subject to forces possible during normal operations, according to the Recommended Guidelines for Safety Inspection of Dams (e.g., where the resultant of forces acting on the dam is located outside the middle third of the base, tensile stresses would develop in the dam section, a condition which is structurally undesirable.)

Critical to the analysis and resulting indication of stability are the items of uplift water pressure acting on the base of the dam and relative permeability of the site's foundation rock. For the "normal operating conditions" case, the analysis uplift force was based on a full headwater hydrostatic pressure acting on the dam's upstream corner and a full tailwater hydrostatic pressure acting on the dam's downstream corner. Uplift pressures were assumed to vary linearly between the dam's upstream and downstream corners, and to act upon 100 percent of the dam base. The resulting uplift force represents a condition that is significant to the indication of instability.

Uplift as computed for the normal operating condition was also assigned to the flood conditions studied, assuming that uplift pressures would not increase significantly over a relatively short flood stage time period because of expected low foundation rock permeability. With this assumption for uplift, the "normal operating condition" represents a loading combination more critical to dam stability than the 1/2 PMF and PMF flood conditions.

The 1934 State Report indicates steel bars were to be provided to anchor the dam base to the site's foundation rock. Information on the location, spacing and embedment of these anchors was not available for the stability analysis performed as part of the present study. Properly installed anchors would increase the dam's resistance to overturning and sliding.

Further structural stability investigation is recommended to fully evaluate the effects of the dam's steel bar anchor system and the uplift forces acting at the base of the dam and the dam's lower section. The investigation should extend to inspection of the dam's upstream face and evaluation of the condition of the concrete in the dam's upstream zone. Plans for repair should include rehabilitation and repair to concrete in areas where deterioration has occurred.

## SECTION 7 - ASSESSMENT/REMEDIAL MEASURES

### 7.1 DAM ASSESSMENT

#### a. Safety

The Phase I visual inspection of the Oatka Creek Dam did not indicate conditions which constitute an immediate hazard to human life or property. During this inspection, the sluice gates which control outflow from the impoundment were operated to draw down the impoundment so that a visual inspection could be made of the spillway surfaces. Upon closing the sluice gates, floatable materials became lodged in the sluice gate opening and prevented closure of the gate. The installation of trash racks upstream from the gates would prevent this malfunction.

The hydrologic/hydraulic analysis indicates that the backwater effect of the bridge on Route 5, immediately downstream from the dam, restricts flow causing submergence of the dam to occur at flows well below the top of dam spillway capacity. The stability analysis indicates that the dam is unstable for all of the conditions prescribed by the Recommended Guidelines for Safety Inspection of Dams.

#### b. Adequacy of Information

The information available is adequate for this Phase I inspection report. Design and construction information is limited to the construction plans.

#### c. Urgency

Both the structural stability of the dam under normal operating conditions and the analysis of the flows that might occur during extraordinary rainfall events represent areas where further investigations should be undertaken. The investigations recommended below should be undertaken immediately and completed within one year. The necessary remedial areas should be completed within two years.

#### d. Need for Additional Investigation

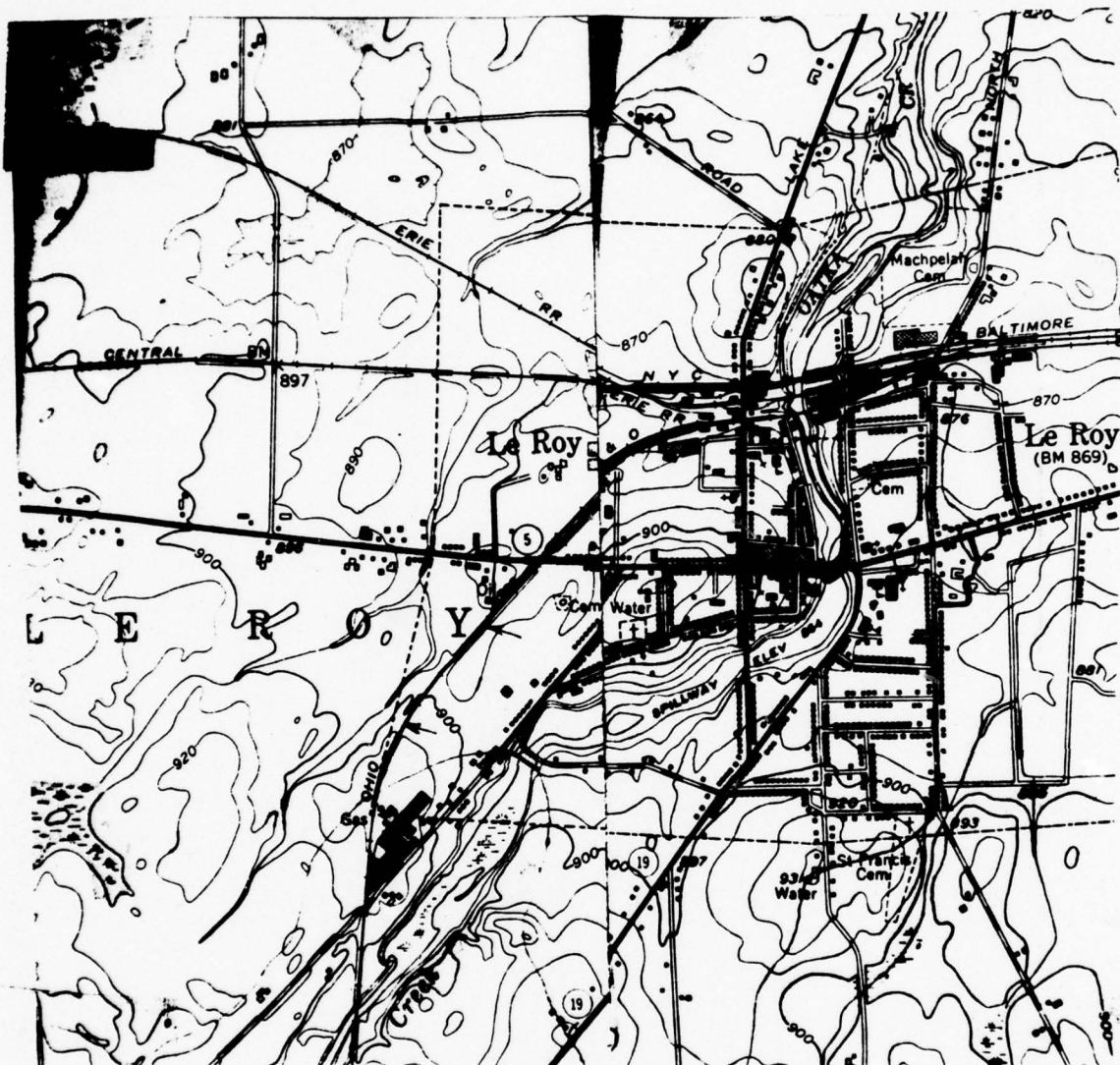
Additional investigations should be undertaken to determine the structural stability of the dam section and the hydrologic capacity of the dam and bridge combination.



## 7.2 RECOMMENDED MEASURES

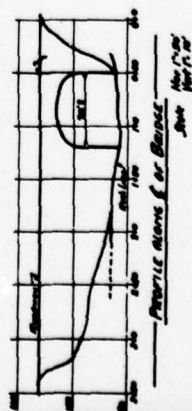
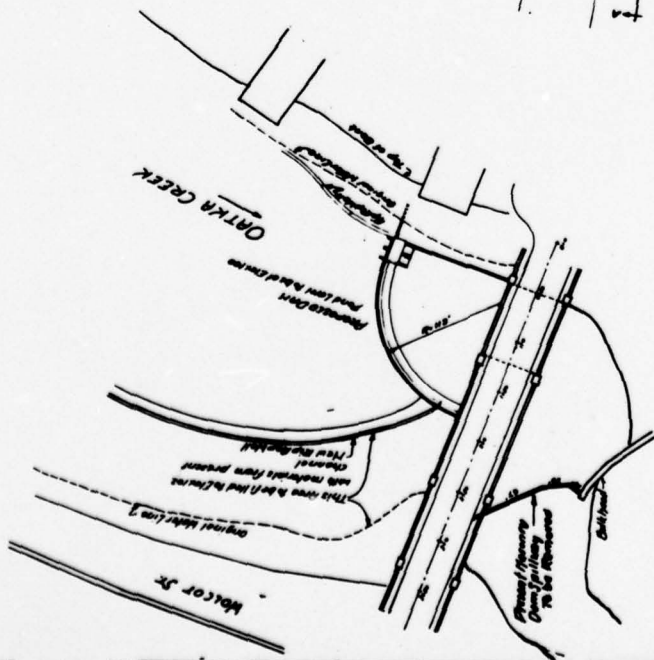
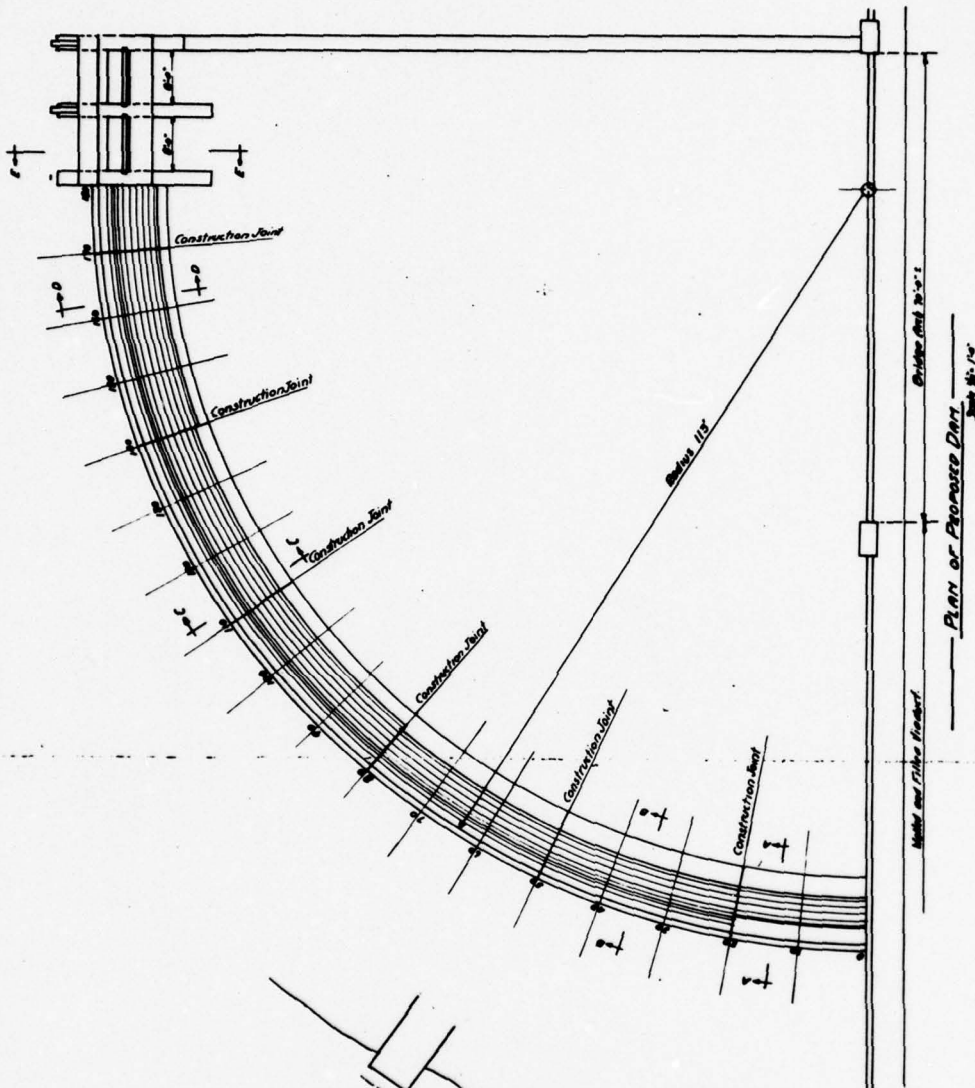
The following steps should be undertaken:

1. A structural stability analysis of the dam should be conducted to determine the effect of the dam's steel bar anchor system and the uplift forces acting at the base of the dam. The investigation should extend to the inspection of the dam's upstream face and evaluation of the condition of the concrete in the dam's upstream zone. Plans for repair should include rehabilitation and repair of concrete joints in areas where minor deterioration has occurred.
2. The bridge opening channel capacity should be investigated to determine the capacity of the dam/bridge combination and a determination should be made as to whether the existing discharge capacity of these structures provides adequate protection to the facility and adjoining properties.
3. Trash racks should be installed upstream from the sluice gates.
4. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of the reservoir drain system. Document this information for future reference.
5. Develop an emergency action plan.

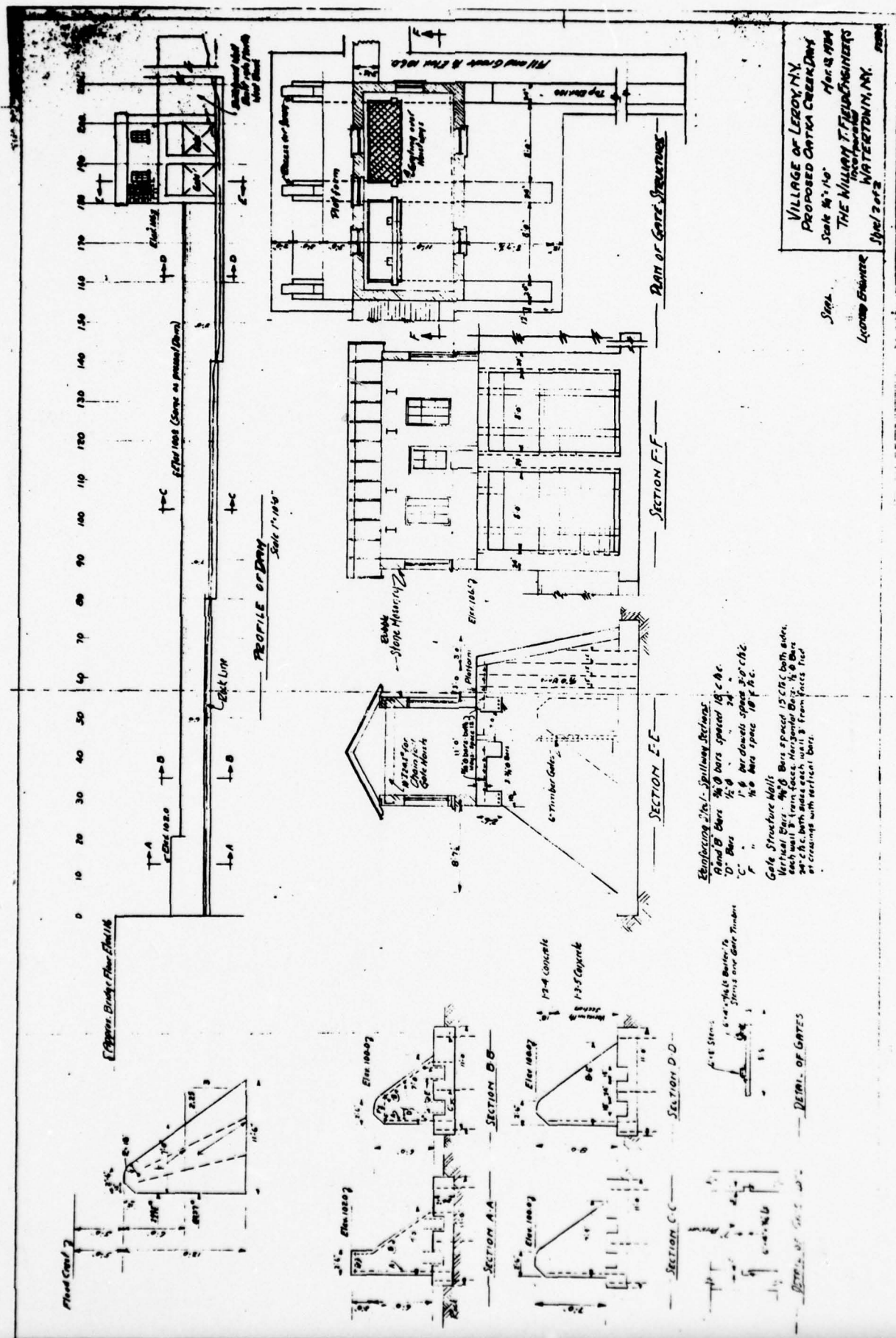


# LOCATION PLAN

FIGURE 1





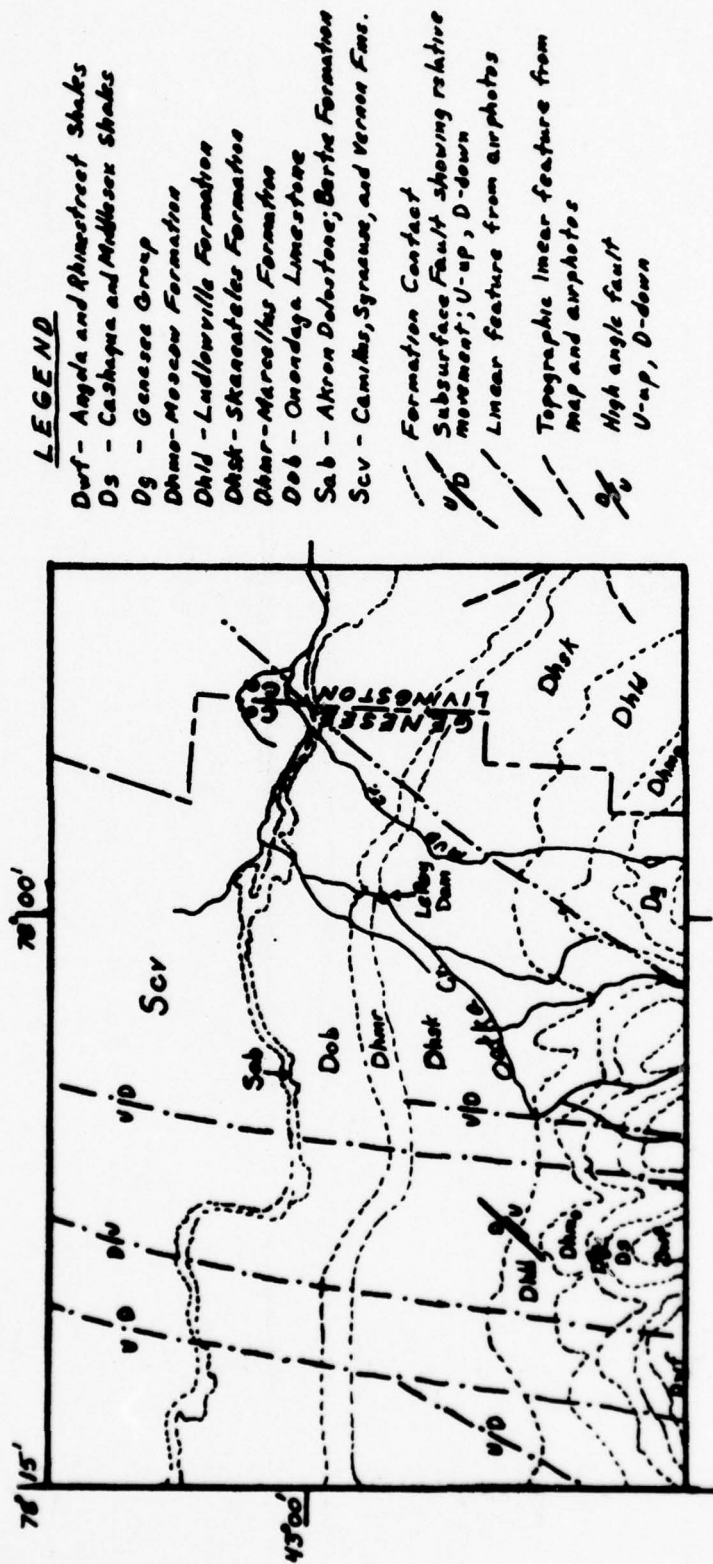


VILLAGE OF LEROY, N.Y.  
 PROPOSED GATE STRUCTURE  
 Scale 1/4" = 1'-0"  
 THE WILLIAM T. FLYNN ENGINEERS  
 100 N. 2ND ST.  
 WATERLOO, N.Y.

Site  
 License Engineer

Reinforcing Steel - Spacing Details  
 Round Bars 1/2" dia. spaced 18" c/c.  
 Flat Bars 1/2" dia. spaced 24" c/c.  
 Gate Structure Walls  
 Vertical Bars 1/2" dia. spaced 15" c/c both sides.  
 Each wall 3' from face. Horizontal Bars 1/2" dia. spaced 15" c/c both sides each wall 3' from face. Tie at corners with vertical bars.

DETAIL OF GATES



APPENDIX A  
FIELD INSPECTION REPORT



**CHECK LIST**  
**VISUAL INSPECTION**

**PHASE 1**

Name Dam Oatka Creek in LeRoy County Genesee State New York ID # NY435  
Type of Dam Crested Concrete Gravity Hazard Category High  
Date(s) Inspection August 9, 1979 Weather Sunny Temperature 70

Pool Elevation at Time of Inspection Top of Crest M.S.L. Tailwater at Time of Inspection --

**Inspection Personnel:**

<u>F.W. Byszewski</u>	<u>Dale Engineering Company</u>
<u>D.F. McCarthy</u>	<u>Dale Engineering Company</u>
<u>H. Muskatt</u>	<u>Dale Engineering Company</u>
<u>J.A. Gomez</u>	<u>Dale Engineering Company</u>
<u>Kermit Arrington</u>	<u>LeRoy Div. D.P.W.</u>

N.F. Dunlevy/J. Gomez Recorder

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
ANY NOTICEABLE SEEPAGE	None.	
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	Good condition.	
DRAINS	None.	
WATER PASSAGES	Twin sluice gates.	
FOUNDATION	Rock according to plans. No field observations were made regarding the foundation material.	

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	Fair/good condition.	Some concrete replacement work occurred in connection to bridge replacement.
STRUCTURAL CRACKING	No significant cracks. Some cracks on spillway crest.	
VERTICAL & HORIZONTAL ALIGNMENT	Good condition.	
MONOLITH JOINTS	Good condition.	
CONSTRUCTION JOINTS	Good condition.	
STAFF GAGE OF RECORDER	None.	



EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	N/A.	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	N/A.	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	N/A.	
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	N/A.	
RIPRAP FAILURES	N/A.	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	N/A.	
ANY NOTICEABLE SEEPAGE	N/A.	
STAFF GAGE AND RECORDER	N/A.	
DRAINS	N/A.	

UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	See comments for main dam. In good condition.	Dam's crest along length.
APPROACH CHANNEL	Reservoir impoundment.	
DISCHARGE CHANNEL	Channel through new bridge (New York State Department of Transportation), small dam (original) below bridge appears as rapids.	
BRIDGE AND PIERS	None.	



GATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	Not visible.	
APPROACH CHANNEL	Reservoir area.	
DISCHARGE CHANNEL	Stream channel.	
BRIDGE AND PIERS	None.	
GATES AND OPERATION EQUIPMENT	Hydraulic equipment operates the two sluice gates constructed of wood.	

**OUTLET WORKS**

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	Through gate spillway described in sheet 7.	
INTAKE STRUCTURE		
OUTLET STRUCTURE		
OUTLET CHANNEL		
EMERGENCY GATE		

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Clear, unobstructed. For 500 feet below bridge, structures well above flood plain - channel sides ripped.	
SLOPES	None.	
APPROXIMATE NO. OF HOMES AND POPULATION	Center of village below main business area. A number of residential streets located below dam. Number of homes in area 4 - 12.	



**INSTRUMENTATION**

<b>VISUAL EXAMINATION OF</b>	<b>OBSERVATIONS</b>	<b>REMARKS OR RECOMMENDATIONS</b>
<b>MONUMENTATION/SURVEYS</b>	None.	
<b>OBSERVATION WELLS</b>	None.	
<b>WEIRS</b>	None.	
<b>PIEZOMETERS</b>	None.	
<b>OTHER</b>	None.	

**RESERVOIR**

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	None. Lawn area slopes 10 to 20 to 1 into reservoir. No structure adjacent to impoundment.	
SEDIMENTATION	None observed.	

**CHECK LIST**  
**ENGINEERING DATA**  
**DESIGN, CONSTRUCTION, OPERATION**  
**PHASE 1**

NAME OF DAM Oatka Creek in LeRoy

ID #                     

ITEM	REMARKS
AS-BUILT DRAWINGS	
REGIONAL VICINITY MAP	
CONSTRUCTION HISTORY	
TYPICAL SECTIONS OF DAM	
OUTLETS - PLAN - DETAILS - CONSTRAINTS - DISCHARGE RATINGS	
RAINFALL/RESERVOIR RECORDS	

ITEM	REMARKS
DESIGN REPORTS	
GEOLOGY REPORTS	
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	
POST-CONSTRUCTION SURVEYS OF DAM	
BORROW SOURCES	



ITEM	REMARKS
MONITORING SYSTEMS	
MODIFICATIONS	
HIGH POOL RECORDS	
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	
MAINTENANCE OPERATION: RECORDS	

ITEM	REMARKS
SPILLWAY PLAN  SECTIONS  DETAILS	
OPERATING EQUIPMENT PLANS & DETAILS	

**CHECK LIST**  
**HYDROLOGIC & HYDRAULIC**  
**ENGINEERING DATA**

**DRAINAGE AREA CHARACTERISTICS:** \_\_\_\_\_

**ELEVATION TOP NORMAL POOL (STORAGE CAPACITY):** \_\_\_\_\_

**ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY):** \_\_\_\_\_

**ELEVATION MAXIMUM DESIGN POOL:** \_\_\_\_\_

**ELEVATION TOP DAM:** \_\_\_\_\_

**CREST:**

- a. Elevation \_\_\_\_\_
- b. Type \_\_\_\_\_
- c. Width \_\_\_\_\_
- d. Length \_\_\_\_\_
- e. Location Spillover \_\_\_\_\_
- f. Number and Type of Gates \_\_\_\_\_

**OUTLET WORKS:**

- a. Type \_\_\_\_\_
- b. Location \_\_\_\_\_
- c. Entrance Inverts \_\_\_\_\_
- d. Exit Inverts \_\_\_\_\_
- e. Emergency Draindown Facilities \_\_\_\_\_

**HYDROMETEOROLOGICAL GATES:**

- a. Type \_\_\_\_\_
- b. Location \_\_\_\_\_
- c. Records \_\_\_\_\_

**MAXIMUM NON-DAMAGING DISCHARGE:** \_\_\_\_\_

APPENDIX B

PREVIOUS INSPECTION REPORTS/RELEVANT CORRESPONDENCE



V. 3/77)

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

DAM INSPECTION REPORT  
(By Visual Inspection)

Dam Number	River Basin	Town	County	Hazard Class	Date & Inspector
35-1002	GENESEE	LERoy	GENESEE	C	7/29/77

Stream = OATKA CREEK

Owner = VILLAGE OF LEROY

## Type of Construction

- ☐ Earth w/Concrete Spillway  
☐ Earth w/Drop Inlet Pipe  
☐ Earth w/Stone or Riprap Spillway  
☒ Concrete  
☐ Stone  
☐ Timber  
☐ Other \_\_\_\_\_

230 APE FT

## Use

- ☐ Water Supply  
☐ Power  
☒ Recreation - ☒ High Density  
☐ Fish and Wildlife  
☐ Farm Pond  
☐ No Apparent Use-Abandoned  
☒ Flood Control  
☒ Other STREAM CHANNEL IMPROVEMENT

Estimated Impoundment Size 40 Acres### Estimated Height of Dam above Streambed 15 Ft.

## Condition of Spillway

- ☒ Service satisfactory  
☐ In need of repair or maintenance  
☒ Auxiliary satisfactory  
☐ In need of repair or maintenance

Explain: \_\_\_\_\_

## Condition of Non-Overflow Section

- ☒ Satisfactory  
☐ In need of repair or maintenance

Explain: \_\_\_\_\_

## Condition of Mechanical Equipment

- ☐ Satisfactory  
☐ In need of repair or maintenance

Explain: \_\_\_\_\_

## Siltation

- ☐ High  
☐ Low

Explain: \_\_\_\_\_

Remarks: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## Evaluation (From Visual Inspection)

- ☐ Repairs req'd. beyond normal maint. ☒ No defects observed beyond normal maint.

## **Specifications**

for

dowels to ~~the~~ Oatka Creek Dam  
placed as shown at

LeRoy, New York

### Spillway Concrete

#### Location

The proposed Oatka Creek Dam is located just Southerly of the Main Street Bridge in the Village of LeRoy, New York and is part of a project for stream channel improvement to eliminate unsightly and unsanitary conditions. The removal of silt and alluvial deposits is being carried on as a C.W.A.

### Spillway Construction

#### Proposed Work

The work contemplated in constructing the proposed dam consists in the excavation of earth and rock for a foundation and the construction of a concrete spillway, waste gates, gate house and bulk heads.

#### Excavation

All earth and soil shall be removed from the rock and a trench or channel excavated in rock with a minimum depth of 12" and a width of at least 11 feet. If in the opinion of the Engineer a greater depth of rock trench is necessary to provide stability, the rock trench shall be excavated as directed.

#### Dowels

One inch round steel bar dowels shall be placed in holes drilled in the rock trench as shown on the plans and grouted in place.

#### Foundation Concrete

Concrete mixed in the proportions of one part Portland Cement, three parts clean sand and five parts broken stone or clean screened gravel shall be poured in the excavated rock trench and brought to a level surface as shown on the plans. Clincher grooves as shown on the plans shall be formed in the foundation or footings and steel bar

dowels to join with the spillway reinforcing shall be placed as shown on the plans.

#### Spillway Concrete

Concrete for the spillway shall be mixed in the proportions shown on the plans, and shall be poured in sections continuously from bottom to top. Sections are shown on the plans as 30 feet long between construction joints but if the equipment available for mixing and placing concrete is not of sufficient capacity to pour such sections in continuous pours, shorter sections acceptable to and approved by the Engineer may be used.

#### Spillway Construction Joints

At the end of each section bulkheaded off a 6"x6" keyway shall be built into the forms to form a pocket or groove the full height of the sections. Horizontal reinforcing bars shall project at least 16" through the bulkhead. After the removal of forms the surface of the construction joint shall be painted with heavy asphaltic paint before pouring concrete in the next section built. Pipes at least 6" longer than the projecting reinforcing bars shall be placed over each projecting bar before continuing the concrete work so that stresses will not be transmitted from one section to another.

#### Gates

Timber gates shall be constructed of dressed cypress lumber bolted and spliced together as shown on the plans.

#### General Specifications

The General Specifications for materials and construction herewith shall govern except as otherwise specified herein or on the plans.



## GENERAL SPECIFICATIONS

### FOR

## MATERIALS AND CONSTRUCTION

### PORTLAND CEMENT

Portland Cement shall conform to the standard specifications and Tests for Portland Cement (Serial Designation C-9-24) of the American Society for Testing Materials.

Cement shall be stored in a dry place and in such a manner as to permit easy access for inspection and identification of each shipment.

Cement shall be delivered at the site of the mixer or place of use in suitable cloth bags or approved 5 ply paper bags.

A bag shall contain 94 pounds net. A barrel shall contain 326 pounds net. One bag of cement shall be considered as containing 95,100 of a cubic foot.

### FINE AGGREGATES

Fine aggregates for concrete shall consist of natural sands and gravels, crushed rock or other inert materials having clean, uncoated grains of strong and durable minerals or a mixture of the above. Fine aggregates shall be so graded that when dry 100 percent by weight shall pass a screen having  $\frac{1}{4}$ " mesh; not more than 25 per cent by weight shall pass a standard No. 30 sieve and not more than 6 per cent shall pass a standard No. 100 sieve. Fine aggregate may be rejected if it contains more than 3 percent of loam, silt, clay, vegetable matter or other deleterious substances.

Fine aggregate or sand for mortar and grout shall consist of clean, hard, durable, uncoated stone particles free from loam, clay, silt and all other deleterious substances. Such aggregate shall be of a size that when dry 100 per cent by weight shall pass a standard No. 10 sieve and not over 5 per cent by weight shall pass a standard No. 100 sieve.

### COARSE AGGREGATE

Coarse Aggregate shall consist of clean, hard, durable uncoated broken stone or gravel. It shall be sized so that 100 per cent by weight shall pass a screen having  $2\frac{1}{4}$ " circular openings and none shall pass a screen having  $\frac{1}{4}$ " square or  $\frac{3}{8}$ " circular openings. No broken stone, gravel or other material showing definite lines of fracture or laminations shall be used.

### REINFORCING STEEL

All reinforcing bars shall be of open hearth steel, rolled from new billets of an approved deformed bar shape. No re-rolled material or cold twisted bars will be accepted. All bars shall meet the requirements given for billet steel concrete reinforcement in the Standard Specifications of the American Society of Testing Materials, Serial Designations A-15-14, intermediate grade.

Steel Fabric may be used in such places as the Engineer may accept or direct. Such fabric shall meet the requirements given for cold drawn steel wire for concrete reinforcement in the Standard Specification of the A. S. T. M., Serial Designation A-82-27.

### STRUCTURAL STEEL

All structural steel beams, shapes, etc., shall conform to the requirements of the Standard Specifications for Structural Steel for Bridges, Serial Designation A-7-24 of the American Society of Testing Materials.

Finished rolled material shall be free from cracks, flaws, seams, laps, ragged edges and other defects. It shall have a smooth, uniform finish and shall be straightened at the mill before shipment.

### IRON AND STEEL CASTINGS

Iron and Steel Castings shall conform to the requirements of the Standard Specifications of the American Society for Testing Materials, Serial Designation A-27-24 for Steel Casting and A-48-14 for Gray Iron Castings.



All Castings shall be true to patterns in form and dimensions and shall be free from cracks, flaws and other defects in position affecting their strength, and durability. Castings which have been welded without the Engineer's permission will be rejected.

#### LUMBER

All lumber and timber used in permanent work shall be of an acceptable kind for the purpose used, sound, square edged free from shakes, loose knots, decay and other defects and shall be planed and framed as required or shown on the plans. Measurements of lumber shall be the number of feet board measure actually placed.

#### PROPORTIONS FOR CONCRETE

Concrete for structures shall in general be mixed in the proportion of one part Portland Cement, two parts fine aggregate and four parts of coarse aggregate by volume. The proportions of aggregates may be varied by the Engineer in order to obtain better working mixtures.

No extra compensation for cement necessary to obtain workable and satisfactory concrete by reason of such variation will be allowed, unless by special order.

Proportions of cement and aggregates shall be accurately measured by means of batch boxes or other devices acceptable to the Engineer. Wheelbarrow measurement will be allowed only in barrows calibrated and marked by the Engineer.

Clean "Bank Run, of Gravel" may be used for aggregate in such places as the Engineer may accept, but such gravel shall not contain more than 40 per cent by volume, of material that will pass a screen having  $\frac{1}{4}$ " square meshes and not contain particles larger than would pass a screen having  $2\frac{1}{4}$ " circular openings. If deemed necessary to add additional cement to obtain a concrete of the desired strength or consistency, no extra compensation will be allowed.

Payment for concrete will be made on the basis of the number of cubic yards of concrete actually in place, unless otherwise called for.

#### FORMS

Forms for concrete shall conform to the shape, lines and dimensions shown on the plans. They shall be substantial and sufficiently tight to prevent leakage of mortar. Ample studding, waling and bracing shall be provided to prevent bulging and to maintain position and shape under the stresses incident to filling and work. Wire ties shall be sparingly used and after the removal of forms such wires to be cut off below the surface and the cavity filled with a mortar of fine aggregate and cement in the proportions used in the concrete. In all straight walls suitable tongue and groove bulkheads for construction joints shall be provided to insure continuity of such walls or members when pouring concrete.

If all walls or members of such dimensions as to be difficult of access, loose boards shall be left for cleaning out forms before placing concrete.

The interior surface of all forms in contact with concrete surfaces shall be of lumber dressed on one face and both edges and shall be so constructed as to leave all surfaces with a smooth even surface. Forms re-used shall be maintained at all times in good condition as to accuracy of shape, strength and smoothness of surface.

#### PLACING REINFORCING STEEL

Metal reinforcing shall be accurately placed as shown on the plans or directed by the Engineer, and shall be securely tied or fastened in place so that placing of concrete will not change its position.

Splices in reinforcing shall provide a lap of at least 16 diameters for deformed bars and 24 diameters for plain bars. All splices shall be securely tied with annealed wire.

#### MIXING CONCRETE

All concrete shall be mixed in approved batch mixers for at least one minute after all materials are in the mixer drum. Aggregates and sand shall first be mixed dry before adding water. Water shall be clear and free from

mud, clay, acids, alkalies, oils and other deleterious substances. Only such amounts of water shall be used as will be required to obtain a plastic workable concrete. Excess water added for the purpose of making concrete flow in the forms will not be permitted.

Hand mixing will only be permitted in case of emergency or in places where very small amounts of concrete are needed. Hand mixing shall be done on water tight platforms or mixing boards and shall proceed as follows: Cement and fine aggregate shall be mixed first dry and then wet to the proper consistency after which the coarse aggregate shall be added and thoroughly mixed.

#### PLACING CONCRETE

No concrete shall be placed until the forms have been thoroughly cleaned and have been inspected by the Engineer.

When concreting has once started, it shall be carried on as a continuous operation until the placing of the section, panel or portion bulkheaded off is completed.

Concrete shall be placed in uniform layers as close as practicable to its final position. It shall be thoroughly compacted by puddling with proper tools and great care shall be exercised to obtain a smooth face free from stone spots and porous places. If for any reason, concreting has to be suspended before a vertical wall or section is completed, the concrete already in place shall be brought to a level and keyways or steel bar dowels placed. Before concreting is resumed, this joint shall be thoroughly scarified, all loose material removed and a paste of neat cement applied. Construction joints or vertical joints in walls shall be located as the Engineer may direct.

No concrete shall be placed in or under water except with the approval of the Engineer and under his direct supervision. When concrete is so placed extra cement in an amount acceptable to the Engineer shall be added to each batch but no extra compensation will be allowed therefore.

#### PLACING CONCRETE IN FREEZING WEATHER

No concrete shall be placed in freezing weather or when the temperature is below 40° Fahrenheit except by permission of the Engineer. In the event of such permission, heating apparatus of approved form shall be provided to heat water and aggregates so that no concrete shall have a temperature of less than 60° Fahrenheit when deposited in the forms. Heating apparatus and covering shall be provided so that the air surrounding concrete may be maintained at a temperature of at least 50° Fahrenheit for a period of five days after placing concrete. The use of salt or chemicals will not be permitted.

#### CURING CONCRETE

Careful attention shall be given to the proper curing of all exposed concrete surfaces. Such surfaces shall be protected from the sun and kept wet for a period to be determined by the Engineer.

#### REMOVAL OF FORMS

The removal of forms shall be carried out in such a manner as to insure the complete safety of the structure. Forms, shoring or braces shall be maintained until the supported portion or member has hardened sufficiently to permit its removal with safety.

#### DAMAGED CONCRETE

All damaged or injured concrete shall be replaced and repaired to the satisfaction of the Engineer before acceptance.

#### BRICK

All brick shall be of the class called for on the plans or in the specifications and shall be hard burned, free from kiln cracks and other defects that would impair the strength or appearance of a structure. Care shall be exercised in handling brick to prevent injury and damage.

**BRICK LAYING.**

All brick shall be laid in cement lime mortar mixed in the proportions of one part lime, one part portland cement and three parts of clean sand. The proportions of cement and lime may be varied to a slight extent to obtain a free working mortar. If required brick shall be wetted before laying. All brick or exposed faces shall be laid to line and shall present true and even faces. Joints and beds shall be full and every precaution taken to obtain air tight walls. An air space for insulation shall be left when directed by the Engineer.



WILLIAM T. FIELD, C. E.  
PRES. AND TREAS.

C. A. SOLAR  
ASST. TREAS.

THE WILLIAM T. FIELD ENGINEERS  
INCORPORATED  
CONSULTING ENGINEERS  
WATERTOWN, N.Y.

ARTHUR H. EMERSON, C. E.  
V. PRES. AND SEC'Y

JAMES W. HAMBLEY, L. S.  
ASST. SEC'Y

March 17, 1934

Mr. Thomas F. Farrell  
Chief Engineer  
State Department of Public Works  
Albany, New York

Attention: Mr. J. P. Neuton

Dear Sir:

We are enclosing herewith an application for the construction of a dam in the Village of Leroy, New York together with blue prints and specifications.

This dam is located on Oatka Creek and is to replace an old stone masonry dam and is part of a project undertaken to dredge out the stream channel as a C.W.A. Project.

No change in pond surface is contemplated as the crest of the new dam will be at the same elevation as that of the old dam.

We believe that the new structure will tend to improve run off conditions as the spill crest proper will be considerably lengthened and gates will be installed for flood relief.

Very truly yours

THE WILLIAM T. FIELD ENGINEERS, INC.

By *A. H. Emerson*

AHE:S

A. H. Emerson,  
Vice-President





FOURTH DISTRICT

WJZ:AML

STATE OF NEW YORK  
DEPARTMENT OF PUBLIC WORKS

FRED'K STUART GREENE  
SUPERINTENDENT

HOWARD E. SMITH, DIST. ENG.  
BARGE CANAL TERMINAL

P. O. BOX 36, EAST AVENUE STATION, ROCHESTER, N. Y.

RECEIVED  
APR 4 1935  
COUNTIES  
IN 4TH DISTRICT  
—  
GENESSEE  
LIVINGSTON  
MONROE  
ONTARIO  
ORLEANS  
WYOMING

ROCHESTER, N. Y., April 3, 1935.

Major T. F. Farrell,  
Chief Engineer,  
Albany, New York.

Dear Sir:-

For your information, I would advise that work on the construction of a new concrete dam across Oatka Creek, at Main Street Bridge in the Village of LeRoy, has been completed. This work was inspected from time to time by employees of this office as the construction work proceeded, and the same was completed in accordance with the approved plans.

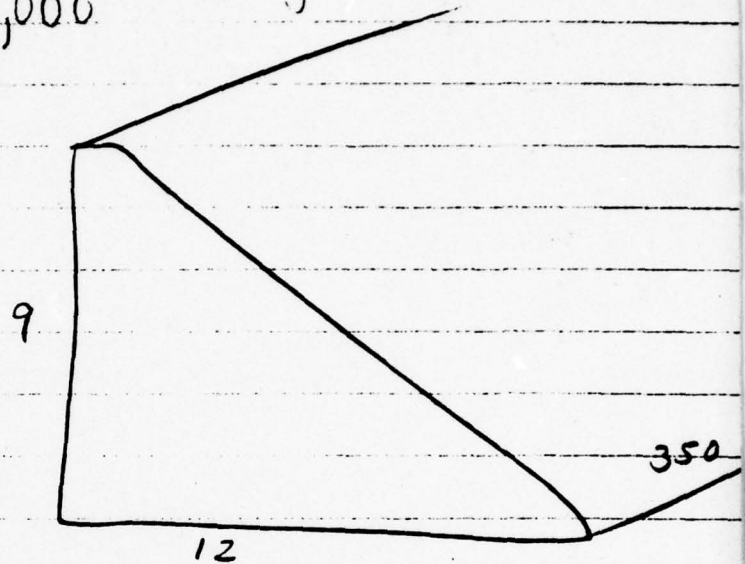
The only addition made to the work was the extension of a core wall from the easterly abutment of the dam and parallel to the curtain wall on the south side of the Main Street bridge, to a point in impervious material about 20' out from the dam. The sluice gates in the dam have been closed and the pond is being filled. The water level on March 26th had reached a point about 15" from the crest.

Very truly yours,

*H. E. Smith*  
H. E. SMITH,  
District Engineer.

# Impounding Capacity

$$43560 \sqrt{\frac{229 \text{ acre ft.}}{10,000,000}}$$



$$V = \frac{(9)(12)(350)}{54} = 700$$

cu yd

STATE OF NEW YORK



DEPARTMENT OF PUBLIC WORKS  
DIVISION OF ENGINEERING

ALBANY

Received Mar. 19, 1934

Dam No. 35-1002

Disposition Mar. 20, 1934

Watershed Genesee

Foundation inspected \_\_\_\_\_

Structure inspected \_\_\_\_\_

**Application for the Construction or Reconstruction of a Dam**

Application is hereby made to the Superintendent of Public Works, Albany, N. Y., in compliance with the provisions of Section 948 of the Conservation Law (see last page of this application) for the approval of specifications and detailed drawings, marked Village of Leroy, N.Y., Proposed Oatka Creek Dam, - Sheets 1 and 2

herewith submitted for the { construction } of a dam herein described. All provisions of law will be complied with in the erection of the proposed dam. It is intended to complete the work covered by the application about Sept. 1, 1934

(Date)  
1. The dam will be on Oatka Creek flowing into Allen Creek and Genesee River in the town of Leroy, County of Genesee and at the Main Street Bridge in the Village of Leroy, N.Y.  
(give exact distance and direction from a well-known bridge, dam, village main cross-roads or mouth of a stream)

2. Location of dam is shown on the New York Caledonia quadrangle of the United States Geological Survey.

3. The name of the owner is The Village of Leroy, N.Y.

4. The address of the owner is Village of Leroy, Leroy, N.Y.

5. The dam will be used for Stream Channel Improvement and Park Purposes

6. Will any part of the dam be built upon or its pond flood any State lands? No

7. The watershed above the proposed dam is about 17.5 square miles.

8. The proposed dam will create a pond area at the spillcrest elevation of 30 to 40 acres and will impound 6 to 10,000,000 cubic feet of water.



9. The maximum height of the proposed dam above the bed of the stream is 9 feet 0 inches  
10. The lowest part of the natural shore of the pond is 4.75 feet vertically above the spillcrest,  
and everywhere else the shore will be at least 6 To 16 feet above the spillcrest.

11. State if any damage to life or to any buildings, roads or other property could be caused by any possible failure of the proposed dam. No

12. The natural material of the bed on which the proposed dam will rest is (clay, sand, gravel, boulders, granite, shale, slate, limestone, etc.) Limestone Shale

13. Facing down stream, what is the nature of material composing the right bank? Concrete Bridge Viaduct, Masonry Building Foundations and Clay Banks

14. Facing down stream, what is the nature of the material composing the left bank? Retaining Wall Concrete Bridge Arch, Old Building Foundations and Clay Banks

15. State the character of the bed and the banks in respect to the hardness, perviousness, water bearing, effect of exposure to air and to water, uniformity, etc. Impervious shale and stiff clay

16. Are there any porous seams or fissures beneath the foundation of the proposed dam? No

17. **WATER.** The spillway of the above proposed dam will be 160 feet long in the clear; the waters will be held at the right end by a Bridge Viaduct the top of which will be 16 feet above the spillcrest, and have a top width of 40 ± feet; and at the left end by a Bulkhead and Gate Structure the top of which will be 6 feet above the spillcrest, and have a top width of See Plans feet.

18. The spillway is designed to safely discharge 7000 cubic feet per second. (Includes Right Bulkhead and Gate Overfall)

19. Pipes, sluice gates, etc., for flood discharge will be provided through the dam as follows:

2 Waste Gates 8'-0" wide

20. What is the maximum height of flash boards which will be used on this dam? None Planned

21. **APRON.** Below the proposed dam there will be an apron built of Concrete feet long across the stream, 1.5 To 3 feet wide and 2 feet thick.

22. Does this dam constitute any part of a public water supply? No



## INSTRUCTIONS

Read carefully on the last page of this application the law setting forth the requirements to be complied with in order to construct or reconstruct a dam.

Each application for the construction or reconstruction of a dam must be made on this standard form, copies of which will be furnished upon request to the Chief Engineer, Division of Engineering, Department of Public Works, Albany, N. Y. The application must be accompanied by three sets of plans, and specifications. The information furnished must be in sufficient detail in order that the stability and safety of the dam can be determined. In cases of large and important dams assumptions made in calculating stresses and stability should be given.

Samples of materials to be used in the dam and of the material on which the dam is to be founded may be asked for, but need not be furnished unless requested.

If the dam constitutes a part of a public water supply, application should be made to the Water Power and Control Commission under Article XI of the Conservation Law.

An application for the construction or reconstruction of a dam must be signed by the prospective owner of the dam or his duly authorized agent. The address of the signer and the date must be given as provided for on the last page of the application form.

## SECTION 948 OF THE CONSERVATION LAW

§ 948. Structures for impounding water; inspection of docks; penalties. No structure for impounding water and no dock, pier, wharf or other structure used as a landing place on waters shall be erected or reconstructed by any public authority or by any private person or corporation without notice to the superintendent of public works, nor shall any such structure be erected, reconstructed or maintained without complying with such conditions as the superintendent of public works may by order prescribe for safeguarding life or property against danger therefrom. No order made by the superintendent of public works shall be deemed to authorize any invasion of any property rights, public or private, by any person in carrying out the requirements of such order. The superintendent of public works shall have power, whenever in his judgment public safety shall so require, to make and serve an order directing any person, corporation, officer or board, constructing, maintaining or using any structure hereinbefore referred to, remove, repair or reconstruct the same within such reasonable time and in such manner as shall be specified in such order, and it shall be the duty of every such person, corporation, officer or board, to obey, observe and comply with such order and with the conditions prescribed by the superintendent of public works for safeguarding life or property against danger therefrom, and every person, corporation, officer or board failing, omitting or neglecting so to do, or who hereafter erects or reconstructs any such structure hereinbefore referred to without submitting to the superintendent of public works and obtaining his approval of plans and specifications for such structures when required so to do by his order or who hereafter fails to remove, erect or to reconstruct the same in accordance with the plans and specifications so approved shall forfeit to the people of this state a sum not to exceed five hundred dollars to be fixed by the court for each and every offense; every violation of any such order shall be a separate and distinct offense, and, in case of a continuing violation, every day's continuance thereof shall be and be deemed to be a separate and distinct offense. This section shall not apply to a dam where the area draining into the pond formed thereby does not exceed one square mile, unless the dam is more than ten feet in height above the natural bed of the stream at any point or unless the quantity of water which the dam impounds exceeds one million gallons; nor to a dock, pier, wharf or other structure under the jurisdiction of the department of docks, if any, in a city of over one hundred and seventy-five thousand population. This section as hereby amended shall not impair the effect of an order heretofore made by the conservation commission or commissioner under this section prior to the taking effect of chapter four hundred and ninety-nine of the laws of nineteen hundred and twenty-one, nor require the approval by the superintendent of public works of plans and specifications heretofore approved by such commission or commissioner under this section.

The foregoing information and accompanying plans and specifications are correct to the best of my knowledge and belief.

Village of Leroy, N.Y., Owner.

The Wm. T. Field Engineers Inc  
By By A. Emerson Vice Pres., authorized agent of owner.

Address of signer 40 Flower Bldg, Watertown, N.Y Date March 15, 1934

(NOTICE: After filling out one of these forms as completely as possible for each dam in your district, return it at once to the Conservation Commission, Albany.)

STATE OF NEW YORK  
CONSERVATION COMMISSION  
ALBANY

SUPERSEDED

By 35-1002

DAM REPORT

July 16, 1917  
(Date)

CONSERVATION COMMISSION,

DIVISION OF WATERS.

SUPERSEDED  
By 35-1002

GENTLEMEN:

I have the honor to make the following report in relation to the structure known as the Seroy Power and Milling Dam.

This dam is situated upon the Oatka Creek  
(Give name of stream)  
in the Town of Seroy, Genesee County,  
about  
(State distance) from the Village or City of Seroy

The distance about stream from the dam, to the on state Highway to Buffalo  
(Up or down) (Give name of nearest important stream or of a bridge)  
is about about  
(State distance)

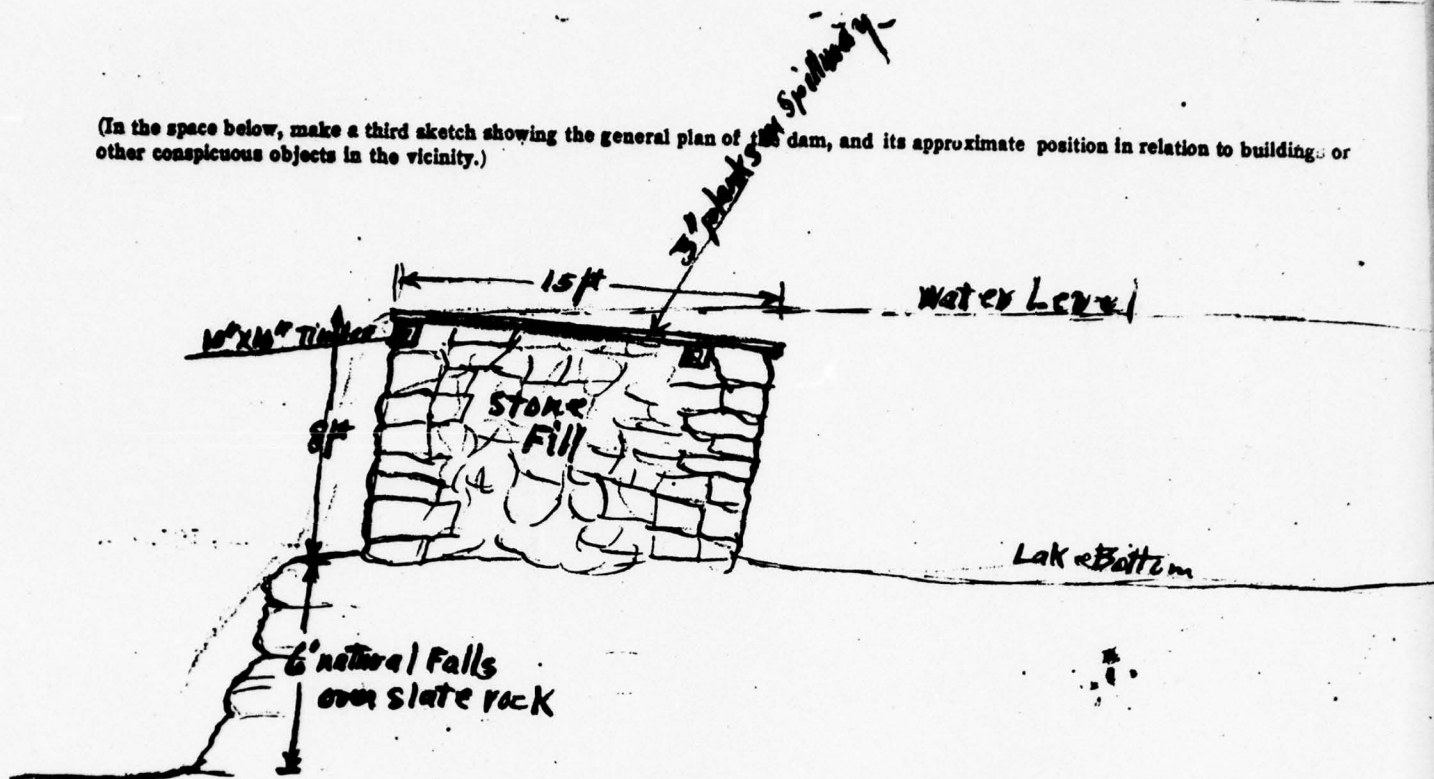
The dam is now owned by Seroy Power and Milling Co.  
(Give name and address in full) Seroy N.Y.  
and was built in or about the year 1830, and was extensively repaired or reconstructed during the year 1917. One gate went out and was built in solid with concrete.

As it now stands, the spillway portion of this dam is built of masonry  
(State whether of masonry, concrete or timber)  
and the other portions are built of masonry (mortar contains much lime)  
(State whether of masonry, concrete, earth or timber with or without rock fill)

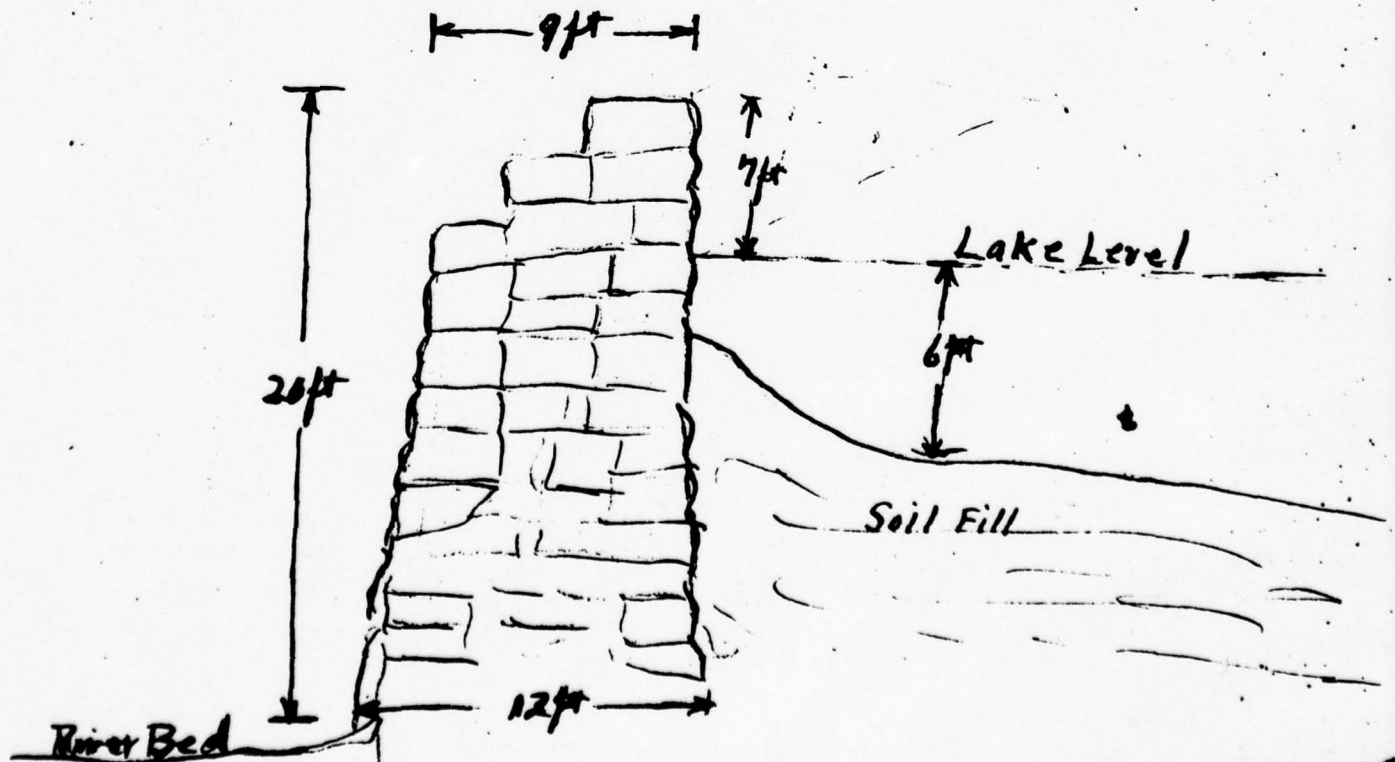
As nearly as I can learn, the character of the foundation bed under the spillway portion of the dam is slate stone and under the remaining portions such foundation bed is " "



(In the space below, make a third sketch showing the general plan of the dam, and its approximate position in relation to buildings or other conspicuous objects in the vicinity.)



Spillway Cross section.



Old masonry dam abutment put up with mortar containing much lime



(In the space below, make one sketch showing the form and dimensions of a cross section through the spillway or waste-weir of this dam and outline the abutment, and a second sketch showing the same information for a cross section through the other portion of the dam. Show particularly the greatest height of the dam above the stream bed, its thickness at the top, and thickness at the bottom, as nearly as you can learn.)

General View

Stream Bed

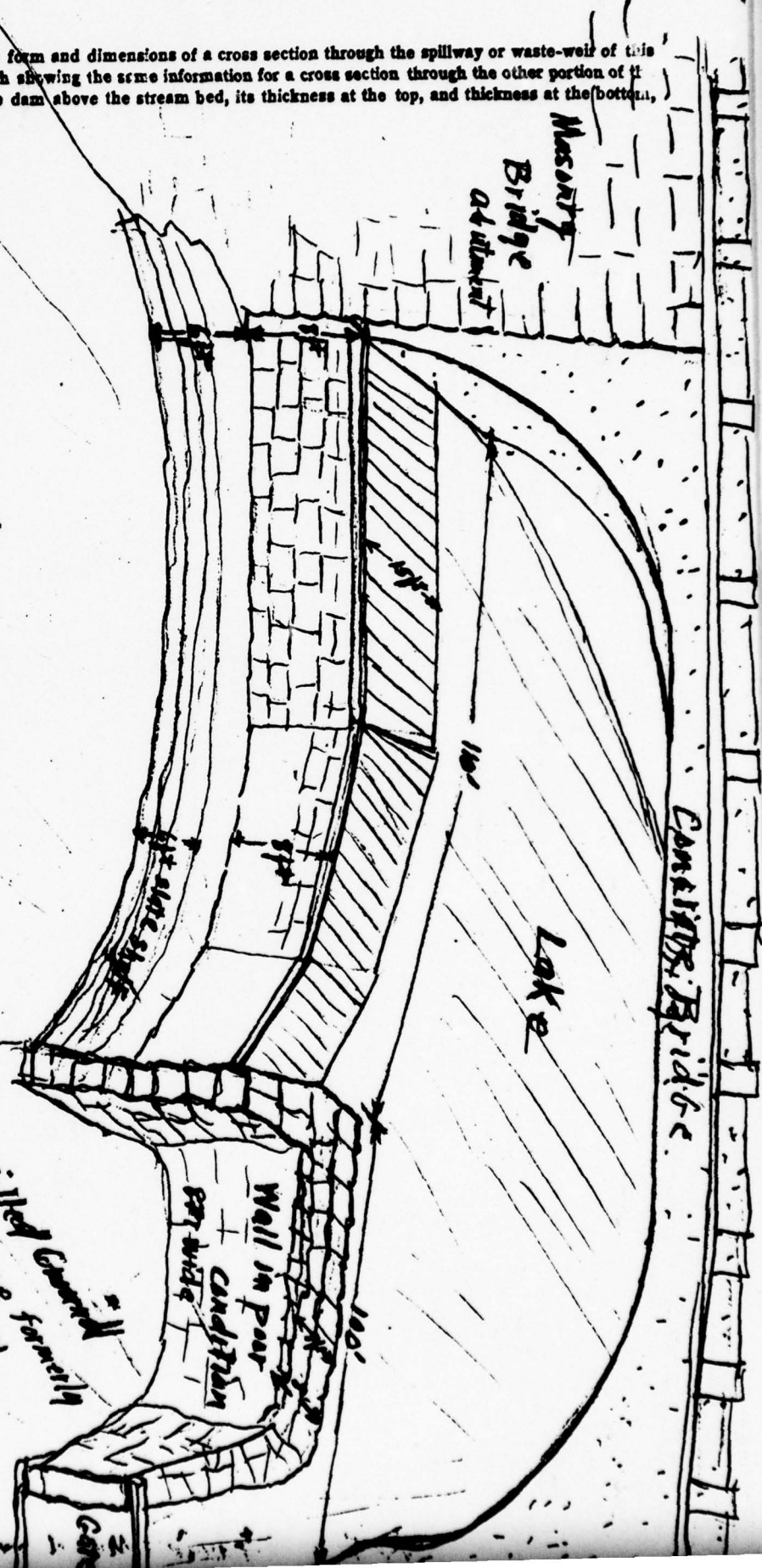
Masonry  
Bridge  
Abutment

Concrete Bridge

Lake

Power House formerly  
filled with  
stood on this wall

Wall in poor  
condition  
very wide



The total length of this dam is 220 feet. The spillway or waste weir portion, is about 110 feet long, and the crest of the spillway is about seven feet below the abutment.

The number, size and location of discharge pipes, waste pipes or gates which may be used for drawing off the water from behind the dam, are as follows: Water is drawn to mill through two gates on east side 6' wide + 5 ft high

At the time of this inspection the water level above the dam was 4 ft. 4 in. below the crest of the spillway.

(State briefly, in the space below, whether, in your judgment, this dam is in good condition, or bad condition, describing particularly any leaks or cracks or erosions which you may have observed.)

*The masonry on the abutment of this dam is in poor condition. But the structure is so heavily built that it is not likely to wash down. A recent flood which was very unusual took out a gate used for power development but the other parts remained intact.*

Reported by Vernon Schilt  
(Signature)

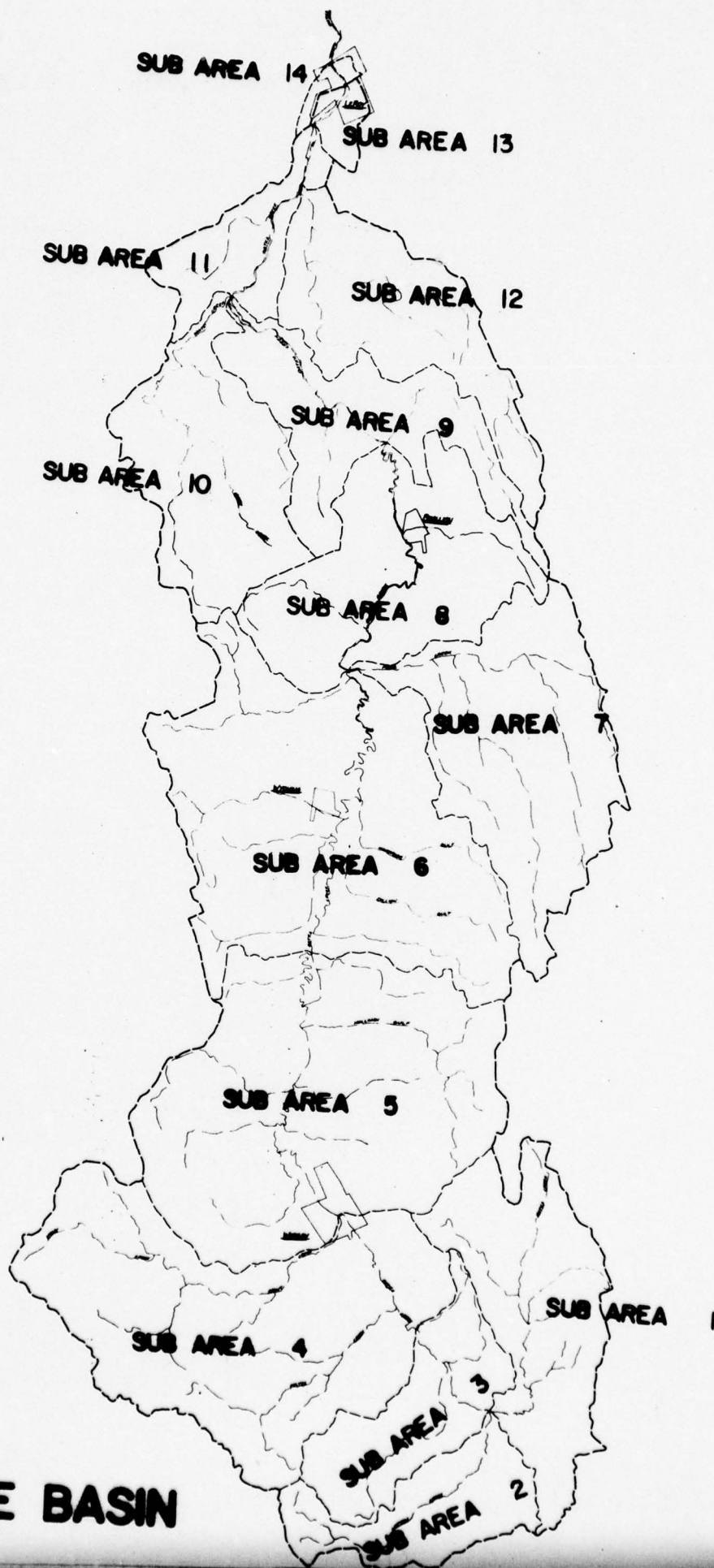
P.O. Box 177 Port Chester N.Y.  
(Address—Street and number, P. O. Box or R. F. D. route)

(Name of place)

APPENDIX C

HYDROLOGIC AND HYDRAULIC COMPUTATIONS





**DRAINAGE BASIN**





STETSON • DALE

BANKERS TRUST BUILDING  
UTICA • NEW YORK • 13501  
TEL 315-797-5800

# DESIGN BRIEF

PROJECT NAME NEW YORK STATE DAM INSPECTION DATE 8.3.79  
SUBJECT DRAINAGE BASIN - SUB AREAS PROJECT NO. 2305  
AREAS DRAWN BY JPG

			<u>AREA</u>	
<u>SUB</u>	<u>AREA</u>		<u>SQ MI</u>	<u>ACRES</u>
"	"	1	8.78	5617.08
"	"	2	4.94	3160.70
"	"	3	5.85	3744.72
"	"	4	19.66	12584.02
"	"	5	22.20	14206.61
"	"	6	21.53	13776.86
"	"	7	12.58	8049.59
"	"	8	10.97	7021.12
"	"	9	7.64	4890.73
"	"	10	9.01	5768.60
"	"	11	7.57	4845.73
"	"	12	8.19	5244.26
"	"	13	.84	541.78
"	"	14	.37	235.08
TOTAL			140.13	89686.88



STETSON • DALE

BANKERS TRUST BUILDING  
UTICA • NEW YORK • 13501

TEL 315-797-5800

## DESIGN BRIEF

PROJECT NAME NEW YORK STATE DAM INSPECTIONDATE 8-14-79SUBJECT OATKA CREEK DAMPROJECT NO. 2305ESTIMATE OF CLARK'S PARAMETERSDRAWN BY JPGESTIMATE OF  $T_c$ 

$$T_c = 11.9 (L^3/H)^{.385}$$

			<u>L (MI)</u>	<u>H (FT)</u>	<u><math>T_c</math> (HRS)</u>	<u>R</u>
SUB AREA	1		6.00	344	9.95	
"	"	2	4.31	494	5.91	
"	"	3	5.38	643	6.89	
"	"	4	8.03	901	9.61	
"	"	5	7.77	804	9.67	
"	"	6	10.72	743	14.46	
"	"	7	7.35	679	9.68	
"	"	8	6.44	445	9.78	
"	"	9	8.90	303	16.47	
"	"	10	6.89	513	10.00	
"	"	11	4.47	100	11.39	
"	"	12	8.52	330	15.15	
"	"	13	1.55	76	3.73	
"	"	14	1.32	80	3.03	

SCS

$$L = \frac{0.8(S+1)^.7}{100V^*.5}$$

$$T_c = L/.6$$

			<u>D (FT)</u>	<u>S</u>	<u>Y (%)</u>	<u>L</u>	<u><math>T_c</math></u>	<u>R</u>
SUB AREA	1		31720	3.70	6	2.53	4.22	
"	"	2	22780		7	1.79	3.00	
"	"	3	28400		5	2.54	4.23	
"	"	4	42400		6	3.20	5.33	
"	"	5	41000		10	2.40	4.01	
"	"	6	56600		10	3.12	5.19	
"	"	7	38800		7	2.76	4.59	
"	"	8	34000		7	2.48	4.13	
"	"	9	47000		7	3.21	5.35	
"	"	10	36400		5	3.10	5.16	
"	"	11	23600		3	2.82	4.71	
"	"	12	45000		5	3.67	6.12	
"	"	13	8200		3	1.21	2.02	
"	"	14	7000		3	1.07	1.78	

**STETSON • DALE**BANKERS TRUST BUILDING  
UTICA • NEW YORK • 13501  
TEL 315-797-5800**DESIGN BRIEF**PROJECT NAME NEW YORK STATE DAM INSPECTIONDATE 8.4.79SUBJECT OATKA CREEK DAMPROJECT NO. 2305ESTIMATE OF SNYDER PARAMETERSDRAWN BY JPS640 CP

$$t_p = C_t (L L_{ca})^{.3}$$

SUB AREA		<u>C<sub>t</sub></u>	<u>L</u>	<u>L<sub>ca</sub></u>	<u>t<sub>p</sub></u>
1		2.5	6.00	2.40	5.56
"	"	2.5	4.31	2.16	4.88
"	"	2.5	5.38	2.25	5.28
"	"	2.5	8.03	4.00	7.08
"	"	2.0	7.77	3.35	5.32
"	"	2.0	10.72	5.50	6.80
"	"	2.5	7.35	4.00	6.89
"	"	2.5	6.44	3.22	6.21
"	"	2.5	8.90	3.28	6.88
"	"	2.5	6.89	3.70	6.60
"	"	3.0	4.47	2.24	5.99
"	"	2.5	8.52	2.80	6.47
"	"	3.0	1.55	.73	3.11
"	"	3.0	1.32	.66	2.88



**STETSON • DALE**BANKERS TRUST BUILDING  
UTICA • NEW YORK • 13501  
TEL 315-797-5800**DESIGN BRIEF**PROJECT NAME NEW YORK STATE DAM INSPECTIONDATE 8.4.79SUBJECT OATKA CREEK DAMPROJECT NO. 2305ESTIMATE OF SNYDER'S PARAMETERSDRAWN BY JPG

$$tr = tp / 5.5$$

			$tp$	$tr$
SUB AREA	1		5.56	1.01
"	2		4.88	.89
"	3		5.28	.96
"	4		7.08	1.28
"	5		5.32	.97
"	6		6.80	1.23
"	7		6.89	1.25
"	8		6.21	1.13
"	9		6.88	1.25
"	10		6.60	1.20
"	11		5.99	1.09
"	12		6.47	1.18
"	13		3.11	.57
"	14		2.88	.52

$$tpr = tp + .25 (tr - tr)$$

$tp$	$tr$	$tr$	$tpr$
5.56	1	1.01	5.56
4.88		.89	4.91
5.28		.96	5.29
7.08		1.28	7.05
5.32		.97	5.32
6.80		1.23	6.74
6.89		1.25	6.83
6.21		1.13	6.18
6.88		1.25	6.82
6.60		1.20	6.55
5.99		1.09	5.97
6.47		1.18	6.43
3.11	1	.57	3.22
2.88	1	.52	3.00



**STETSON • DALE**BANKERS TRUST BUILDING  
UTICA • NEW YORK • 13501  
TEL 315-797-5800**DESIGN BRIEF**PROJECT NAME NEW YORK STATE DAM INSPECTIONDATE 8.3.79SUBJECT OATKA CREEK DAMPROJECT NO. 2305DEPTH - DURATION RELATIONSHIPDRAWN BY JPGPMF - INDEX RAINFALL - 21" ; 200 SQ MI ; 24 HRS

<u>DURATION</u>	<u>DEPTH</u>	<u>% INDEX</u>
6 HR	16.80	80
12 HR	19.74	94
24 HR	22.26	106
48 HR	23.10	110

OATKA CREEK DAM									
(C001)	A1	HEC-1DB	PMF - OVERTOPPING ANALYSIS						
(C002)	A2	1	1	0	0	0	0	0	4
(C003)	A3	5	1	0	0	0	0	0	
(C004)	B1	1	1	0	0	0	0	0	
(C005)	B1	5	1	0	0	0	0	0	
(C006)	J1	1	1	0	0	0	0	0	
(C007)	J1	1	1	0	0	0	0	0	
(C008)	J1	1	1	0	0	0	0	0	
(C009)	K1	1	1	0	0	0	0	0	
(C010)	M1	1	1	0	0	0	0	0	
(C011)	F1	1	1	0	0	0	0	0	
(C012)	F1	1	1	0	0	0	0	0	
(C013)	N1	1	1	0	0	0	0	0	
(C014)	X1	1	1	0	0	0	0	0	
(C015)	X1	1	1	0	0	0	0	0	
(C016)	K1	1	1	0	0	0	0	0	
(C017)	M1	1	1	0	0	0	0	0	
(C018)	F1	1	1	0	0	0	0	0	
(C019)	T1	1	1	0	0	0	0	0	
(C020)	N1	1	1	0	0	0	0	0	
(C021)	X1	1	1	0	0	0	0	0	
(C022)	K1	1	1	0	0	0	0	0	
(C023)	K1	1	1	0	0	0	0	0	
(C024)	K1	1	1	0	0	0	0	0	
(C025)	K1	1	1	0	0	0	0	0	
(C026)	Y1	1	1	0	0	0	0	0	
(C027)	Y1	1	1	0	0	0	0	0	
(C028)	Y6	1	1	0	0	0	0	0	
(C029)	Y7	1	1	0	0	0	0	0	
(C030)	Y7	1	1	0	0	0	0	0	
(C031)	K1	1	1	0	0	0	0	0	
(C032)	K1	1	1	0	0	0	0	0	
(C033)	M1	1	1	0	0	0	0	0	
(C034)	F1	1	1	0	0	0	0	0	
(C035)	T1	1	1	0	0	0	0	0	
(C036)	N1	1	1	0	0	0	0	0	
(C037)	X1	1	1	0	0	0	0	0	
(C038)	X1	1	1	0	0	0	0	0	

(0039)	K1	COMBINE 2 HYDROGRAPHS AT 2CC									
(0040)	K	1	4	C	C	C	1	C	1		
(0041)	K1	CHANNEL ROUTE THRU SUB AREA-4									
(0042)	Y	C	0	C	1	1		C			
(0043)	Y1	1	0	C	C	C		C	-1		
(0044)	Y6	.08	.04	.08	997	1050		14000	.010		
(0045)	Y7	100	1000	1000	1010	1800		1000	1848		
(0046)	Y7	1900	1000	1950	1010	3750		1050			
(0047)	K	0	4	C	C	C		C	1		
(0048)	K1	SUB AREA-4 RUNOFF									
(0049)	M	1	1	19.66	0	104.1		0	C	1	
(0050)	F	0	21.0	80	94	104		110			
(0051)	T	C	C	C	C	C		C	1		
(0052)	W	7.08	.77	C	C	C		C	0.1		
(0053)	X	40	40	1							
(0054)	K	2	300	C	C	C		C	1		
(0055)	K1	COMBINE 2 HYDROGRAPHS AT 3CC									
(0056)	K	1	5	C	C	C		C	1		
(0057)	K1	CHANNEL ROUTE THRU SUB AREA-5									
(0058)	Y	C	0	C	1	1		C	-1		
(0059)	Y1	1	C	C	C	C		C	.001		
(0060)	Y6	.08	.04	.08	949	1000		31000	1850		
(0061)	Y7	100	1000	1000	960	1800		950			
(0062)	Y7	1900	950	2150	960	4450		970			
(0063)	K	C	5	C	C	C		C	1		
(0064)	K1	SUB AREA-5 RUNOFF									
(0065)	M	1	1	22.2	0	140.1		C	C	1	
(0066)	F	0	21.0	80	94	104		110			
(0067)	T	C	C	C	C	C		C	1		
(0068)	W	5.32	.77	C	C	C		C	0.1		
(0069)	X	44	44	1							
(0070)	K	2	400	C	C	C		C	1		
(0071)	K1	COMBINE 2 HYDROGRAPHS AT 4CC									
(0072)	K	1	6	C	C	C		C	1		
(0073)	K1	CHANNEL ROUTE THRU SUB AREA-6									
(0074)	Y	C	C	C	1	1		C			
(0075)	Y1	1	C	C	C	C		C	-1		
(0076)	Y6	.08	.04	.08	933	970		46000	.0003		

(C0071)	Y7	100	970	1750	950	2650	940	2700	933	2750	933		
(C0072)	Y7	2400	940	3600	950	4500	950						
(C0073)	K1							1					
(C0074)	K1		SUB AREA-6 RUNOFF										
(C0075)	K1	1	1	21.53	0	104.1	0	0	C	1			
(C0076)	F	0	21.0	80	94	106	110						
(C0077)	T	0			0			1	0.1				
(C0078)	T	6.80	.77		0								
(C0079)	K1	43	43	1	0			1					
(C0080)	K1	0	7		0								
(C0081)	K1			SUB AREA-7 RUNOFF									
(C0082)	K1	1	1	12.58	0	104.1	0	0	C	1			
(C0083)	F	0	21.0	80	94	106	110						
(C0084)	T	0			0			1	0.1				
(C0085)	T	0			0								
(C0086)	K1	0.89	.77		0								
(C0087)	X	25		1	0			1					
(C0088)	K1	3	500	0	0			1					
(C0089)	K1		COMBINE 3 HYDROGRAPHS AT 5CC										
(C0090)	K1	1	8		0			1					
(C0091)	K1		CHANNEL ROUTE THRU SUB AREA-8										
(C0092)	Y1	0	0	0	1			-1					
(C0093)	Y1	1	0		0								
(C0094)	Y6	.08	.04	.08	918	950	30200						
(C0095)	Y6	100	950	700	930	1100	920	-0007					
(C0096)	Y7	1200	920	2100	940	3000	950	1125	918	1175	918		
(C0097)	K1	0	8	0	0			1					
(C0098)	K1		SUB AREA-8 RUNOFF										
(C0099)	K1	1	1	10.97	0	104.1	0	0	C	1			
(C0100)	M	0	21.0	80	94	106	110						
(C0101)	F	0			0			1	0.1				
(C0102)	T	0			0								
(C0103)	X	6.21	.77		0								
(C0104)	X	22	22	1	0			1					
(C0105)	K1	2	600	0	0			1					
(C0106)	K1		COMBINE 2 HYDROGRAPHS AT 6CC										
(C0107)	K1	1	9		0			1					
(C0108)	K1		CHANNEL ROUTE THRU SUB AREA-9										
(C0109)	K1	0	0	0	1			-1					
(C0110)	Y1	1	0	0	0								
(C0111)	Y1	1	0	0	0								
(C0112)	Y1	1	0	0	0								
(C0113)	Y1	1	0	0	0								
(C0114)	Y1	1	0	0	0								



(C115)	Y6	-08	-04	-08	911	950	20500	-0004	919	1250	919	(
(C116)	Y7	100	950	700	930	1200	920	1210				(
(C117)	Y7	1400	920	1600	940	3200	930					(
(C118)	K1	C	9	C	0	C	0	1				(
(C119)	K1	SUB AREA-9 RUNOFF										
(C120)	M	1	1	7.64	0	104.1	0	C	C	1		(
(C121)	F	C	21.0	80	94	106	110	1				(
(C122)	T	C	C	C	0	C	0	1	0.1			(
(C123)	X	6.78	-77	C	0							(
(C124)	X	15	15	1	0							(
(C125)	K1	C	10	0	0	0	0	1				(
(C126)	K1	SUB AREA-10 RUNOFF										
(C127)	M	1	1	9.01	0	104.1	0	C	0	1		(
(C128)	F	C	21.0	80	94	106	110					(
(C129)	T	C	0	0	0	C	0	1	0.1			(
(C130)	X	6.60	-77	C	0							(
(C131)	X	18	700	1	C	C	C	1				(
(C132)	K1	3	11	C	0							(
(C133)	K1	COMBINE 3 HYDROGRAPHS AT 700										
(C134)	K1	1	11	C	0	C	0	1				(
(C135)	K1	CHANNEL ROUTE THRU SUB AREA-11										
(C136)	Y1	C	C	C	1	1	0	-1				(
(C137)	Y1	1	0	0	0	C	0					(
(C138)	Y6	-08	-04	-08	896	910	11600	-002	896	850	896	(
(C139)	Y7	100	910	500	900	750	898	760				(
(C140)	Y7	860	898	1000	900	1100	910	1				(
(C141)	K1	C	11	0	0	C	0					(
(C142)	K1	SUB AREA-11 RUNOFF										
(C143)	X	1	1	7.57	0	104.1	0	C	C	1		(
(C144)	F	C	21.0	80	94	106	110	0.1				(
(C145)	T	C	C	C	0	C	1					(
(C146)	X	5.99	-77	C	0							(
(C147)	X	15	15	1	0	C	1					(
(C148)	K1	C	12	C	0	C	0					(
(C149)	K1	SUB AREA-12 RUNOFF										
(C150)	M	1	1	8.19	0	104.1	0	C	C	1		(
(C151)	F	C	21.0	80	94	106	110					(
(C152)	T	C	C	C	0	C	0	1	0.1			(

[illegible]

QATKA CREEK DAM

**PAGE 0006**

	K1	SUB AREA-14	RUNOFF
(Q191)	K1	1	1
(Q192)	M	1	37
(Q193)	F	C	21.0 C
(Q194)	T	C	0 C
(Q195)	W	2.0	-77
(Q196)	X	1	1
(Q197)	K	2	1000 C
(Q198)	K1	COMBINE 2	HYDROGRA
(Q199)	K	99	

COMBINE 2 HYDROGRAPHS AT 1000

55

(0200) A  
(0201) A  
(0202) A  
(0203) A  
(0204) A

\*\*\*\*\*  
 FLOOD HYDROGRAPH PACKAGE (HEC-1)  
 DAM SAFETY VERSION JULY 1978  
 LAST MODIFICATION 26 FEB 79  
 \*\*\*\*\*

RUN DATE? WED, AUG 29 1979  
 TIME? 16:12:00

OATKA CREEK DAM  
 HEC-1DB  
 FMF - OVERTOPPING ANALYSIS

JOB SPECIFICATION									
NG	NLR	NMIN	IDAY	IHR	IMIN	METRC	IFLT	IPRT	INSTAN
90	1	0	0	0	0	0	0	4	0
	JCFR	NWT	LRCPT	TRACE					
	5	0	0	0					

MULTI-PLAN ANALYSES TO BE PERFORMED  
 NPLAN= 1 NRTIO= 6 LRTIO= 1  
 RTIOS= 0.20 0.40 0.50 0.60 0.80 1.00

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# SUB-AREA RUNOFF COMPLETION

SUB AREA-1 RUNOFF									
ISTAQ	ICCP	IECON	ITAPE	JFLT	JPRT	INAME	ISTAGE	IAUTO	
1	0	0	0	0	0	1	0	0	

HYDROGRAPH DATA									
IHYG	IUG	TAREA	SNAP	TRSDA	TRSF	RATIC	ISNOW	ISAME	LOCAL
1	1	8.78	0.00	140.10	0.00	0.000	0	1	0

PRECIP DATA									
SPFE	PMS	R6	R12	R24	R48	R72	R96		
0.00	21.00	80.00	94.00	106.00	110.00	0.00	0.00		

TRSF COMPLETED BY THE PROGRAM IS 0.875

LOSS DATA									
LAOPT	STRK	DLTK	RTIO	ERAIN	STRKS	RTIOK	STRIL	CNSTL	ALSPX
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.10	0.00

UNIT HYDROGRAPH DATA  
 TF= 5.56 CP=0.77 NTA= 0

RECESSION DATA  
 STRIQ= 18.00 ORCSN= 18.00 RTIOR= 1.00



UNIT HYDROGRAPH 21 END-OF-PERIOD ORDINATES, LAG= 5.58 HOURS, CP= 0.77 VOL= 1.00

59.	211.	401.	592.	731.	780.	738.	597.	432.	312.
225.	163.	117.	85.	61.	44.	32.	23.	17.	12.

MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q

SUM	20.21	16.99	3.22	97428.	SUM	20.21	16.99	3.22	97428.
	( 513.)	( 431.)	( 82.)	( 2758.85)		( 513.)	( 431.)	( 82.)	( 2758.85)

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SUB AREA-2 RUNOFF

ISTAG 1 ICCMF C IECON 0 ITAPE 0 JPLT 0 JFRT 0 INAME 1 ISTAGE 0 IAUTO 0

HYDROGRAPH DATA

IRHGE	1	IUPG	1	TAREA	4.94	SNAP	0.00	TRSDA	140.10	RATIO	0.00	ISNOW	0	ISAME	1	LOCAL	0
-------	---	------	---	-------	------	------	------	-------	--------	-------	------	-------	---	-------	---	-------	---

PRECIP DATA

SPFE	0.00	PMS	21.00	R6	80.00	R12	94.00	R24	106.00	R48	110.00	R72	0.00	R96	0.00
------	------	-----	-------	----	-------	-----	-------	-----	--------	-----	--------	-----	------	-----	------

TRSF. COMPUTED BY THE PROGRAM IS 0.875

LOSS DATA

LROPT	0	STKR	0.00	DLTKR	0.00	RTIOL	1.00	ERAIN	0.00	STRKS	0.00	RTIOK	1.00	STRTL	1.00	CNSTL	0.10	ALSMX	0.00	RTIMP	0.00
-------	---	------	------	-------	------	-------	------	-------	------	-------	------	-------	------	-------	------	-------	------	-------	------	-------	------

UNIT HYDROGRAPH DATA

TF= 4.88 CP=0.77 NTA= 0

RECESSION DATA

SIRTG= 10.00 URCSN= 10.00 RTIOR= 1.00

UNIT HYDROGRAPH 16 END-OF-PERIOD ORDINATES, LAG= 4.85 HOURS, CP= 0.76 VOL= 1.00

47.	164.	308.	435.	500.	484.	386.	268.	185.	127.
28.	61.	42.	29.	20.	14.	9.	7.		

MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q

SUM	20.21	16.99	3.22	54775.	SUM	20.21	16.99	3.22	54775.
	( 513.)	( 431.)	( 82.)	( 1551.05)		( 513.)	( 431.)	( 82.)	( 1551.05)

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COMBINE HYDROGRAPHS

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COMBINE 2 HYDROGRAPHS AT 100  
ISTAG ICOMP IECON ITAPE JPLT JFRT INAME ISTAGE IAUTO  
100 2 0 0 0 0 1 0 0

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HYDROGRAPH ROUTING

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CHANNEL ROUTE THRU SUB AREA-3  
ISTAG ICOMP IECON ITAPE JPLT JFRT INAME ISTAGE IAUTO  
3 1 0 0 0 0 1 0 0  
ROUTING DATA  
QLCSS CLOSS AVG IRES ISAME IOPT IFMP LSTR  
C.O 0.C00 0.C0 1 1 0 0 0  
NSTPS NSTDL LAG AMSKK X TSK STGRA ISFRAT  
1 0 0 0.C00 0.C00 0.C00 -1. 0

NORMAL DEPTH CHANNEL ROUTING

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GN(1) GN(2) GN(3) ELNVT ELMAX RLNTH SEL  
0.C000 0.0400 0.0800 1139.0 1160.0 1100.0 0.01500

CROSS SECTION COORDINATES---STA,ELEV,STA,ELEV---ETC

100.00 1160.00 300.00 1150.00 399.00 1140.00 400.00 1139.00 405.00 1139.00  
406.00 1140.00 900.00 1150.00 950.00 1160.00

STORAGE	0.00	1.78	14.63	45.76	95.18	162.90	248.91	353.21	475.80
	775.85	947.55	1126.92	1314.02	1508.84	1711.36	1921.60	2139.55	2365.21
CUTFLOW	0.00	27.91	170.32	602.69	1465.41	2876.76	4942.88	7761.74	11425.18
	21669.97	29231.83	37915.88	47704.36	58591.05	70576.48	83665.67	97666.36	113188.63
STAGE	1139.00	1140.11	1141.21	1142.32	1143.42	1144.53	1145.63	1146.74	1147.84
	1150.05	1151.16	1152.26	1153.37	1154.47	1155.58	1156.68	1157.79	1158.89
FLOW	0.00	27.91	170.32	602.69	1465.41	2876.76	4942.88	7761.74	11425.18
	21669.97	29231.83	37915.88	47704.36	58591.05	70576.48	83665.67	97666.36	113188.63

MAXIMUM STAGE IS 1144.7

MAXIMUM STAGE IS 1146.2  
 MAXIMUM STAGE IS 1146.8  
 MAXIMUM STAGE IS 1147.3  
 MAXIMUM STAGE IS 1148.2  
 MAXIMUM STAGE IS 1149.0

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SUB-AREA RUNOFF COMPUTATION

SUB AREA-3 RUNOFF  
 ISTAQ 3 IECON 0 ITAFE 0 JPLT 0 JPRT 0 INAME 1 ISAGE 0 LAUTO 0

HYDROGRAPH DATA  
 IHYD 1 IUNG 1 TAREA 5.85 SNAP 0.00 TRSDA 140.10 TRSFC 0.00 RATIO C.00C ISAME 1 LOCAL 0

PRECIP DATA  
 SFPE 0.00 PMS 21.00 R6 80.00 R12 94.00 R24 106.00 R48 110.00 R72 100.00 R96 100.00

TRSF C COMPUTED BY THE PROGRAM IS 0.875

LOSS DATA  
 LROPT 0 STPKR 0.00 DLTKR 0.00 RTIOL 1.00 ERAIN 0.00 STRKS 0.00 RTIOK 1.00 STRTL 1.00 CNSTL 0.10 ALSMX 0.00 RTIIP 0.00

UNIT HYDROGRAPH DATA  
 TF= 5.28 CP=0.77 NTA= 0

RECESION DATA  
 STRTQ= 12.00 QRCSN= 12.00 RTIOR= 1.00

UNIT HYDROGRAPH 19 END-OF-PERIOD ORIGINATES, LAG= 5.27 HOURS, CP= 0.76 VOL= 1.00  
 44. 156. 295. 429. 522. 547. 502. 390. 271. 188.  
 131. 63. 44. 31. 21. 15. 7.

END-OF-PERIOD FLOW  
 MO.DA HR.MN PERIOD RAIN EXCS LCSS COMP Q MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q  
 SUM 20.21 16.99 3.22 64895.  
 ( 513.)( 431.)( 82.)( 1837.62)



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# COMBINE HYDROGRAPHS

## COMBINE 2 HYDROGRAPHS AT 200

ISTAQ ICOMP IECON ITAPE JPLT JPRT INAME ISTAGE IAUTO  
200 2 0 0 0 0 1 0 0

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# HYDROGRAPH ROUTING

## CHANNEL ROUTE THRU SUB AREA-4

ISTAQ ICCMP IECON ITAPE JPLT JPRT INAME ISTAGE IAUTO  
4 1 0 0 0 0 1 0 0

## ROUTING DATA

QLOSS CLOSS AVG IRES ISAPE IOFT IPMP LSTR  
C.C 0.000 C.CC 1 1 0 0 0

NSIPS NSTDL LAG AMSKK X ISK STGRA ISPRAT  
1 0 0 0.000 0.000 -1. 0

## NORMAL DEPTH CHANNEL ROUTING

GN(1) GN(2) GN(3) ELNVT ELMAX RLNTH SEL  
0.0800 0.0400 0.0800 997.0 1050.0 14000.0 C100C

## CROSS SECTION COORDINATES--STA=ELEV/STA=ELEV--ETC

100.00 1050.00 1000.00 1010.00 1800.00 1000.00 1848.00 997.00 1875.00 997.00  
1900.00 1000.00 1950.00 1010.00 3750.00 1050.00

STORAGE	0.00	54.63	234.95	627.40	1232.42	2047.47	3040.87	4203.07	5534.08
	8702.48	10539.80	12545.91	14720.80	17064.48	19576.95	22258.20	25108.23	28127.05
OUTFLOW	0.00	932.37	5156.52	14554.29	30876.01	56235.73	93157.55	140755.88	199678.81
	354601.56	452155.25	564128.00	691271.75	834323.88	994009.25	1171039.75	1366114.50	1579922.25
STAGE	997.00	997.74	1002.58	1005.37	1008.16	1010.95	1013.74	1016.53	1019.32
	1024.89	1027.68	1030.47	1033.26	1036.05	1038.84	1041.63	1044.42	1047.21
FLOW	0.00	932.37	5156.52	14554.29	30876.01	56235.73	93157.55	140755.88	199678.81
	354601.56	452155.25	564128.00	691271.75	834323.88	994009.25	1171039.75	1366114.50	1579922.25

MAXIMUM STAGE IS 1002.2



MAXIMUM STAGE IS 1003.2  
 MAXIMUM STAGE IS 1004.4  
 MAXIMUM STAGE IS 1005.1  
 MAXIMUM STAGE IS 1006.0  
 MAXIMUM STAGE IS 1006.8

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SUB-AREA RUNOFF COMPUTATION

SUB AREA-4 RUNOFF  
 ISTAQ 4 ICCPF 0 IECON 0 ITAFE 0 JFLT 0 JFRT 0 INAME 1 ISTAGE 0 IAUTO 0

INVDG 1 IUNG 1 TAREA 19.66 SNAP 0.00 TRSDA 0.00 TRSPC 0.00 RATIO 0.000 ISNOW 0 ISAME 1 LOCAL 0

HYDROGRAPH DATA

PRECIP DATA

SPFE 0.00 PMS 21.00 R6 0.00 R12 94.00 R24 104.00 R48 110.00 R72 0.00 R96 0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.868

LOSS DATA

LROPT 0 STKR 0.00 DLTKR 0.00 RTIOL 1.00 ERIN 0.00 STRKS 0.00 RTIOL 1.00 STRTL 1.00 CNSTL 0.10 ALSX 0.00 RTIMP 0.00

UNIT HYDROGRAPH DATA

TF= 7.00 CP=0.77 NTA= 0

RECESSION DATA

STRIQ= 40.00 QRCSN= 40.00 RTIOR= 1.00

UNIT HYDROGRAPH 26 END-OF-PERIOD ORIGINATES, LAG= 7.02 HOURS, CP= 0.76 VOL= 1.00  
 75. 283. 548. 830. 1101. 1302. 1395. 1385. 1252. 1019.  
 788. 610. 472. 360. 263. 219. 170. 131. 102. 79.  
 01. 47. 36. 28. 22. 17.

END-OF-PERIOD FLOW

MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q  
 SUM 20.05 16.56 3.49 212576.  
 ( 509.)( 421.)( 89.)( 6019.48)

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# COMBINE HYDROGRAPHS

## COMBINE 2 HYDROGRAPHS AT 300

ISTAQ IICMP IECON ITAPE JPLT JPRT INAPE ISTAGE IAUTO  
300 0 2 0 0 0 0 1 0 0

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## HYDROGRAPH ROUTING

### CHANNEL ROUTE THRU SUB AREA-5

ISTAQ IICMP IECON ITAPE JPLT JPRT INAPE ISTAGE IAUTO  
5 1 0 0 0 0 1 0 0

### ROUTING DATA

QLCSS CLOSS AVG IRES ISAME IOPT IPMP LSTR  
C.O 0.000 C.O 1 1 0 0 C

NSTPS NSTDL LAG AMSKK X TSK STORA ISFRAT  
1 0 0 0.000 0.000 -1. C

## NORMAL DEPTH CHANNEL ROUTING

GN(1) GN(2) GN(3) ELNVT ELMAX RLNTH SEL  
0.0800 0.0400 0.0800 949.0 1000.0 31000. 0.00100

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC  
100.00 100.00 100.00 960.00 1800.00 950.00 1850.00 949.00 1860.00 949.00  
1900.00 950.00 2150.00 960.00 4450.00 970.00

STORAGE	0.00	264.98	1063.01	2399.42	4274.22	6995.04	11006.92	16313.49	22896.39
	37208.14	44537.08	51981.38	59541.04	67216.08	75006.48	82912.27	90533.41	99069.51
OUTFLOW	0.00	527.91	2668.51	7024.60	14145.81	24591.08	41161.73	64661.28	97107.48
	175179.58	255859.94	323830.13	398852.88	480746.56	569368.63	664606.13	766367.88	874580.00
STAGE	949.00	951.68	954.37	957.05	959.74	962.42	965.11	967.79	970.47
	975.84	978.53	981.21	983.89	986.58	989.26	991.95	994.63	997.32
FLOW*	0.00	527.91	2668.51	7024.60	14145.81	24591.08	41161.73	64661.28	97107.48
	195179.58	255859.94	323830.13	398852.88	480746.56	569368.63	664606.13	766367.88	874580.00

MAXIMUM STAGE IS 956.6

MAXIMUM STAGE IS 959.4

MAXIMUM STAGE IS 960.4

MAXIMUM STAGE IS 961.3  
MAXIMUM STAGE IS 962.8  
MAXIMUM STAGE IS 964.6

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SUB AREA-5 RUNOFF

ISTAQ 5 ICOMP 0 IECON 0 ITAPE 0 JPLT 0 JFRI 0 INAME 1 ISAME 1 ISAGE 0 I AUTO 0

HYDROGRAPH DATA

INHYD 1 IUPG 1 TAREA 22.20 SNAF 0.00 TRSDA 140.10 TRSPC 0.00 RATIO 0.000 ISNOW 0 ISAME 1 LOCAL 0

PRECIP DATA

SPFE 0.00 PMS 21.00 R6 28.00 R12 94.00 R24 104.00 R48 110.00 R72 0.00 R96 0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.875

LOSS DATA

LROPT 0 STRKR 0.00 DLTKR 0.00 RTIOL 1.00 ERAIN 0.00 STIRS 0.00 RTIOK 1.00 STRTL 1.00 CNSTL 0.10 ALSMX 0.00 RTIMP 0.00

UNIT HYDROGRAPH DATA

TF= 5.32 CP=0.77 NTA= C

RECESSION DATA

STRTO= 44.00 GRCSN= 44.00 RTIOR= 1.00

UNIT HYDROGRAPH 19 END-OF-PERIOD ORDINATES, LAG= 5.32 HOURS, CP= 0.77 VOL= 1.00  
100. 585. 1104. 1611. 1964. 2065. 1910. 1497. 1041. 724.  
503. 243. 169. 118. 82. 57. 40. 27.

NO.DA HR.MN PERIOD RAIN EXCS LOSS COMP G  
END-OF-PERIOD FLOW  
SUM 20.21 16.70 3.50 242088.  
( 513.)( 424.)( 89.)( 6855.16)

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COMBINE HYDROGRAPHS

COMBINE 2 HYDROGRAPHS AT 4LL

ISTAQ ICCMP IECON ITAPE JPLT JFRT INAME ISTAGE IAUTO  
400 0 2 0 0 0 1 0 0

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HYDROGRAPH ROUTING

CHANNEL ROUTE THRU SUB AREA-6

ISTAQ ICCMP IECON ITAPE JPLT JFRT INAME ISTAGE IAUTO  
6 1 0 0 0 0 1 0 0

ROUTING DATA

QLOSS CLCSS AVG IRES ISAME IOFT IFPP LSTR  
C.O 0.00 0.00 1 0 0 0 0

NSTPS NSTDL LAG AMSKK X TSK STORA ISFRAT  
1 0 0 0.000 0.000 -1. C

NORMAL DEPTH CHANNEL ROUTING

GN(1) GN(2) GN(3) ELNVT ELMAX RLNTH SEL  
0.000 0.000 0.000 933.0 970.0 46000. 0.00030

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

100.00 970.00 1750.00 950.00 2650.00 940.00 2700.00 933.00 2750.00 933.00  
2800.00 940.00 3600.00 950.00 4500.00 950.00

STORAGE	0.00	131.42	320.04	565.87	920.09	1844.74	3450.11	5736.20	8703.01
	12746.32	24925.97	31555.91	38456.20	45686.85	53247.84	61139.19	69360.89	77912.52
CUTFLOW	C.O	109.55	393.45	869.85	1638.44	2962.67	5059.57	8161.70	12470.73
	26230.09	37743.18	51508.41	67492.28	85686.00	106095.28	128735.09	153626.69	180795.75
STAGE	933.00	934.95	936.89	938.84	940.79	942.74	944.68	946.63	948.58
	952.47	954.42	956.37	958.31	960.26	962.21	964.16	966.10	968.05
FLOW	C.O	109.55	393.45	869.85	1638.44	2962.67	5059.57	8161.70	12470.73
	26230.09	37743.18	51508.41	67492.28	85686.00	106095.28	128735.09	153626.69	180795.75

MAXIMUM STAGE IS 945.3

MAXIMUM STAGE IS 948.6

MAXIMUM STAGE IS 949.8

MAXIMUM STAGE IS 950.8



MAXIMUM STAGE IS 952.3  
MAXIMUM STAGE IS 953.7

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SUB-AREA RUNOFF COMPLETION

SUB AREA-6 RUNOFF  
ISTAQ 6  
ICOMP C  
IECON 0  
ITAFE 0  
JPLT 0  
JPRT 0  
INAME 1  
ISTAGE C  
IAUTO 0

HYDROGRAPH DATA  
IHYDG 1  
IUNG 1  
TAREA 21.53  
SNAP C.CC  
TRSDA 104.10  
TRSPC 0.00  
RATIO 0.000  
ISNOW 0  
ISAME 1  
LOCAL 0

PRECIP DATA  
R12 R24 R48 R72 R96  
RC 94.00 106.00 110.00 C.00 C.00  
R48 R96  
R22 C.00 C.00

TRSPC COMPUTED BY THE PROGRAM IS 0.868

LOSS DATA  
LROFT STKR DLTK RTICL ERAIN STRKS RTIOK STRTL CNSTL ALSMX RTIMP  
C 0.00 1.00 C.00 C.00 1.00 1.00 1.00 0.10 C.CC C.CC

UNIT HYDROGRAPH DATA  
TF= 6.80 CF=0.77 NTA= C

RECESSION DATA  
STRTQ= 43.00 QRCN= 43.00 RTIOR= 1.00

UNIT HYDROGRAPH 26 END-OF-PERIOD ORDINATES, LAG= 6.79 HCLRS, CP= 0.77 VOL= 1.00  
93. 334. 648. 579. 1288. 1502. 1584. 1540. 1337. 1052.  
210. 624. 481. 371. 285. 220. 169. 130. 101. 77.  
60. 46. 35. 27. 21. 16.

END-OF-PERIOD FLOW  
MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q NO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q  
SUM 20.05 16.83 3.21 236738.  
( 509.)( 428.)( 82.)( 6703.67)

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SUB-AREA RUNOFF COMPLETION

SUB AREA-7 RUNOFF  
ISTAQ 7  
ICOMP C  
IECON 0  
ITAFE 0  
JPLT 0  
JPRT 0  
INAME 1  
ISTAGE C  
IAUTO 0

AD-A077 487

NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/13  
NATIONAL DAM SAFETY PROGRAM. OATKA CREEK DAM (NY 435), GENESEE --ETC(U)  
SEP 79 J B STETSON

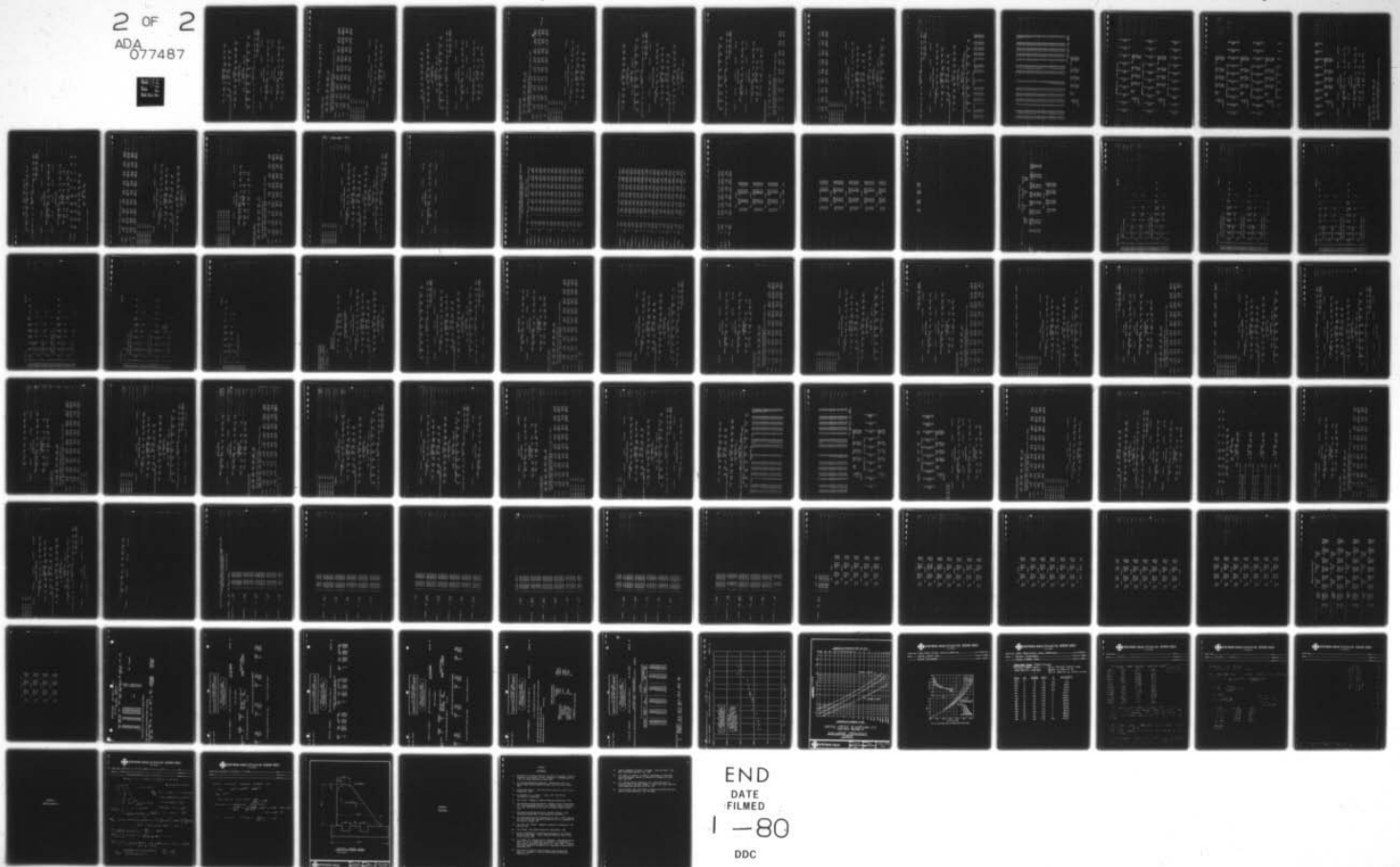
DACW51-79-C-0001

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UNCLASSIFIED

2 OF 2

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077487



TRSPC COMPUTED BY THE PROGRAM IS 0.868

HYDROGRAPH DATA  
SNAP TRSDA TRSPC RATIO ISNOW ISAME LOCAL  
0.00 12.58 0.00 104.10 0.00 0 1 0

PRECIP DATA  
R6 R12 R24 R48 R72 R96  
0.00 21.00 80.00 94.00 100.00 110.00 0.00 0.00 0.00

LOSS DATA  
LROPT STRKR DLTKR RTIOL ERAIN STRKS RTIOL STRTL CNSTL ALSMX RTIWP  
0 0.00 0.00 1.00 1.00 0.00 1.00 1.00 0.10 0.00 0.00

UNIT HYDROGRAPH DATA  
TF= 6.89 CP=0.77 NTA= 0

RECESSION DATA  
STRTQ= 25.00 GRCSN= 25.00 RTIOR= 1.00

UNIT HYDROGRAPH 26 END-OF-PERIOD ORIGINATES, LAG= 6.86 HOURS, CP= 0.76 VOL= 1.00  
53. 190. 368. 736. 861. 912. 891. 781. 620.  
481. 373. 290. 174. 135. 105. 63. 49.  
38. 23. 18. 14. 11.

END-OF-PERIOD FLOW  
NO.DA HR.MN PERIOD RAIN EXCS LOSS COMP G NO.DA HR.MN PERIOD RAIN EXCS LOSS COMP G  
SUM 20.05 16.83 3.21 138226.  
( 509.)( 428.)( 82.)( 3914.12)

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COMBINE HYDROGRAPHS

COMBINE 3 HYDROGRAPHS AT 500

ISTAG ICCMP IECON ITAPE JPLT JFRT INAME ISTAGE I AUTO  
500 3 0 0 0 0 0 1 0 0

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HYDROGRAPH ROUTING

CHANNEL ROUTE THRU SUB AREA-8

ISTAG ICCMP IECON ITAPE JPLT JFRT INAME ISTAGE I AUTO  
8 1 0 0 0 0 1 0 0  
ROUTING DATA  
QLOSS CLOSS AVG IRES ISAME IOFT IPFP LSTR  
0.00 0.000 0.00 1 1 0 0 0 0

NSTPS 1 NSTDL 0 LAG 0 AMSKK 0.000 X 0.000 ISK 0.000 STORA -1. ISFRAT 0

NORMAL DEPTH CHANNEL ROUTING

GN(1) GN(2) GN(3) ELNVT ELMAX RLNTH SEL  
 0.0800 0.0400 0.0800 918.0 950.0 30200.0 0.00070

CROSS SECTION COORDINATES--STA-ELEV, STA-ELEV--ETC  
 100.00 950.00 700.00 930.00 1100.00 920.00 1125.00 918.00 1175.00 918.00  
 1200.00 920.00 2100.00 940.00 3000.00 950.00

STORAGE	C.00	62.96	254.04	590.20	1093.52	1763.99	2601.63	3606.42	4770.84
	7542.47	9149.52	10904.07	12806.11	14894.52	17218.75	19778.97	22575.18	25607.37
CUTFLOW	C.00	140.25	600.54	1489.81	2915.18	4977.50	7769.48	11378.04	15947.81
	28007.03	35607.34	44333.75	54243.99	64450.93	76192.83	89607.16	104771.55	121769.77
STAGE	918.00	919.68	921.37	923.05	924.74	926.42	928.11	929.79	931.47
	934.84	936.53	938.21	939.89	941.58	943.26	944.95	946.63	948.32
FLOW	C.00	140.25	600.54	1489.81	2915.18	4977.50	7769.48	11378.04	15947.81
	28007.03	35607.34	44333.75	54243.99	64450.93	76192.83	89607.16	104771.55	121769.77

MAXIMUM STAGE IS	928.9
MAXIMUM STAGE IS	932.7
MAXIMUM STAGE IS	934.1
MAXIMUM STAGE IS	935.3
MAXIMUM STAGE IS	937.6
MAXIMUM STAGE IS	939.6

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SUB-AREA RUNOFF COMPLETION

SUB AREA-8 RUNOFF

ISTAG	ICOMP	IECON	ITAPE	JFLT	JFRT	INAME	ISTAGE	IAUTO
8	C	0	0	0	0	1	C	0

HYDROGRAPH DATA

IHYDC	IUPG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	10.97	C.00	104.10	C.00	C.000	C	1	C

PRECIP DATA



SPFE PMS R6 R12 R24 R48 R72 R96  
C.00 21.00 8C.00 94.00 106.00 110.00 0.00 C.00

TRSPC COMPUTED BY THE PROGRAM IS 0.868

LOSS DATA  
LROPT STRKR DLTKR RTIOL ERAIN STRKS RTIOK SIRTLC CNSTL \*ALSMX RTIMP  
0 0.00 0.00 1.00 1.00 0.00 1.00 1.00 0.10 C.00 C.00

UNIT HYDROGRAPH DATA  
TF= 6.21 CP=0.77 NTA= 0

RECESSION DATA  
STRTO= 22.00 QRCNM= 22.00 RTIOR= 1.00

UNIT HYDROGRAPH 22 END-OF-PERIOD ORDINATES, LAG= 6.18 HOURS, CP= 0.76 VOL= 1.00  
58. 207. 395. 591. 761. 862. 880. 816. 488.  
359. 194. 143. 105. 77. 57. 42. 31. 23.  
17. 12.

MC.DA HR.MN PERIOD RAIN EXCS LCSS COMP Q MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q  
0  
SUM 20.05 16.83 3.21 120524.  
( 509.)( 428.)( 82.)( 3412.86)

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COMBINE HYDROGRAPHS

COMBINE 2 HYDROGRAPHS AT 600  
ISTAQ ICCMP IECON ITAFE JPLT JPRT INAME ISTAGE IAUTO  
600 2 0 0 0 0 0 1 0 0

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HYDROGRAPH ROUTING

CHANNEL ROUTE THRU SUB AREA-9  
ISTAQ ICCMP IECON ITAFE JPLT JPRT INAME ISTAGE IAUTO  
9 1 0 0 0 0 1 0 0  
ROUTING DATA  
OLCROSS CLOSS AVG IPRES ISAME IOFT IMPP LSTR  
C.0 0.000 0.00 1 1 0 0 0 0  
NSTPS NSTOL LAG AMSKK X TSK STORA ISFRAT  
1 C 0 0.000 C.000 C.000 -1. C

# NORMAL DEPTH CHANNEL ROUTING

GN(1) GN(2) GN(3) ELNVT ELMAX RLNTH SEL  
0.0800 0.0800 0.0800 511.0 550.0 20500.0 0.00040

## CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

100.00 950.00 700.00 930.00 1200.00 920.00 1210.00 919.00 1250.00 919.00  
1400.00 940.00 1600.00 940.00 3200.00 930.00

STORAGE C.00 0.00 C.00 0.00 5.63 197.88 523.77 568.63 1332.45  
3043.73 4359.65 6022.13 8081.16 10536.76 13260.87 16047.24 18693.08 21798.41

OUTFLOW C.00 0.00 C.00 0.00 2.65 433.34 1621.15 3547.03 6261.90  
14171.87 20121.23 27854.68 37662.46 49824.82 65863.80 84588.95 105697.48 129114.52

STAGE 911.00 913.05 915.11 917.16 919.21 921.26 923.32 925.37 927.42  
931.53 933.58 935.63 937.63 939.74 941.79 943.84 945.89 947.95

FLOW C.00 0.00 C.00 0.00 2.65 433.34 1621.15 3547.03 6261.90  
14171.87 20121.23 27854.68 37662.46 49824.82 65863.80 84588.95 105697.48 129114.52

MAXIMUM STAGE IS 929.6

MAXIMUM STAGE IS 933.7

MAXIMUM STAGE IS 935.1

MAXIMUM STAGE IS 936.3

MAXIMUM STAGE IS 936.5

MAXIMUM STAGE IS 940.4

\*\*\*\*\* SUB-AREA RUNOFF COMPUTATION \*\*\*\*\*

## SUB AREA-4 RUNOFF

ISTAG ICONF IECON ITAPE JPLT JFRT INAME ISTAGE IAUO  
9 0 0 0 0 1 0 0

HYDROGRAPH DATA  
HYDQ IUNG TAREA SNAF TRSDA TRSFC RATIO ISNOW ISAME LOCAL  
1 1 7.64 0.00 104.10 0.00 0.000 0 1 0

PRECIP DATA  
SPEE PMS R6 R72 R48 R96  
C.00 21.00 0.00 94.00 100.00 110.00 0.00 0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.868

LRPT	STKR	DLTKR	RTIOL	ERAIN	STKS	RTIOL	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.10	0.00	0.00

UNIT HYDROGRAPH DATA  
TF= 6.88 CP=C.77 NTA= C

RECESSION DATA  
STRTQ= 15.00 QRCNSN= 15.00 RTIOR= 1.00

UNIT HYDROGRAPH 26 END-OF-PERIOD ORDINATES, LAG= 6.85 HOURS, CP= 0.76 VOL= 1.00  
32. 116. 224. 340. 448. 524. 554. 542. 474. 376.  
292. 226. 175. 136. 106. 82. 63. 49. 38. 30.  
23. 18. 14. 11. 8. 6.

MO.DA HR.MN PERIOD RAIN EXCS LCSS COMP Q MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q  
SUM 20.05 16.83 3.21 83934.  
( 509. )( 428. )( 82. )( 2376.74 )

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SUB-AREA RUNOFF COMPLETION

SUB AREA-10 RUNOFF									
ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO	
10	0	0	0	0	0	1	0	0	

HYDROGRAPH DATA									
IFYDR	IUHC	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	9.01	0.00	104.10	0.00	0.000	0	1	0

PRECIP DATA  
SPFE PMS RC R12 R24 R48 R72 R96  
0.00 21.00 80.00 94.00 106.00 110.00 0.00 0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.868

LRPT	STKR	DLTKR	RTIOL	ERAIN	STKS	RTIOL	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.10	0.00	0.00

UNIT HYDROGRAPH DATA  
TF= 6.60 CP=C.77 NTA= C

RECESSION DATA  
STRTQ= 18.00 QRCNSN= 18.00 RTIOR= 1.00



UNIT HYDROGRAPH 25 END-OF-PERIOD ORIGINATES, LAC= 6.62 HOURS, CP= 0.77 VOL= 1.00

41.	147.	285.	429.	561.	650.	680.	654.	558.	431.
328.	250.	190.	145.	110.	84.	64.	49.	37.	28.
21.	16.	12.	5.	7.					

MO-DA HR.MN PERIOD RAIN EXCS LOSS COMP Q

END-OF-PERIOD FLOW

SUM 20-05 16-83 3-21 99066-  
( 509.)( 428.)( 82.)( 2805.23)

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COMBINE HYDROGRAPHS

COMBINE 3 HYDROGRAPHS AT 700

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
700	3	0	0	0	0	1	0	0

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HYDROGRAPH ROUTING

CHANNEL ROUTE THRU SUB AREA-11

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
11	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRCS	ISAME	IOPT	IPPP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS NSTDL LAG AMSKK X TSK STORA ISPRAT

1	0	0.000	0.000	-1.	0
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NORMAL DEPTH CHANNEL ROUTING

GA(1) GN(2) GN(3) ELNVT ELMAX RLNTH SEL

0.000	0.0400	0.0000	896.0	910.0	11600.	0.00200
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CROSS SECTION COORDINATES---STA,ELEV,STA,ELEV---ETC

STA	ELEV	STA	ELEV
100.00	910.00	500.00	900.00
800.00	898.00	1000.00	910.00

STORAGE	0.00	18.38	38.21	60.57	104.31	176.23	272.92	378.77	491.85
	759.70	874.46	1016.46	1165.68	1322.13	1485.81	1656.72	1834.86	2020.22
OUTFLOW	0.00	91.34	294.29	595.09	1040.30	1681.90	2600.59	3790.64	5215.33



STAGE	8755.54	10871.54	13220.88	15806.65	18632.43	21702.20	25020.12	28550.57	32418.07
896.00	896.74	897.47	898.21	898.95	899.68	900.42	901.16	901.89	
903.37	904.10	904.84	905.58	906.32	907.05	907.79	908.53	909.26	
0.00	91.34	294.29	595.09	1040.30	1681.90	2600.59	3790.64	5215.33	
8755.54	10871.54	13220.88	15806.65	18632.43	21702.20	25020.12	28550.57	32418.07	

MAXIMUM STAGE IS 904.3

MAXIMUM STAGE IS 907.5

MAXIMUM STAGE IS 908.8

MAXIMUM STAGE IS 909.9

MAXIMUM STAGE IS 912.2

MAXIMUM STAGE IS 914.8

\*\*\*\*\* SUB-AREA RUNOFF COMPLETION \*\*\*\*\*

# SUB AREA-11 RUNOFF

INHYG	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	7.57	0.00	104.10	0.00	0.000	0	1	0

PRECIP DATA  
R1 R2 R3 R4 R5 R6 R7 R8 R9 R10 R11 R12 R13 R14 R15 R16 R17 R18 R19 R20 R21 R22 R23 R24 R25 R26 R27 R28 R29 R30 R31 R32 R33 R34 R35 R36 R37 R38 R39 R40 R41 R42 R43 R44 R45 R46 R47 R48 R49 R50 R51 R52 R53 R54 R55 R56 R57 R58 R59 R60 R61 R62 R63 R64 R65 R66 R67 R68 R69 R70 R71 R72 R73 R74 R75 R76 R77 R78 R79 R80 R81 R82 R83 R84 R85 R86 R87 R88 R89 R90 R91 R92 R93 R94 R95 R96 R97 R98 R99 R100

TRSPC COMPUTED BY THE PROGRAM IS 0.868

LOSS DATA	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	0.00	0.00

UNIT HYDROGRAPH DATA  
TF= 5.99 CP=0.77 NTA= C

RECESSION DATA  
STRTQ= 15.00 QRCN= 15.00 RTIOR= 1.00

UNIT HYDROGRAPH 22 END-OF-PERIOD ORDINATES, LAG= 5.93 HOURS, CP= 0.76 VOL= 1.00  
 4. 159. 305. 455. 574. 630. 621. 532. 405. 300.  
 165. 122. 90. 07. 49. 37. 27. 20. 15.  
 11. 5.

0  
MO.DA HR.MN PERIOD RAIN EXCS LCSS END-OF-PERIOD FLOW  
COMP Q MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q

SUM 20.05 20.05 0.00 98771.  
(-509.)(-509.)( 0.)(-2796.88)

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SUB-AREA RUNOFF COMPUTATION

SUB AREA-12 RUNOFF

ISTAQ ICOPP IECON ITAPE JPLT JPRT INAME ISTAGE IAUTO  
12 0 0 0 1 0 0 0

HYDROGRAPH DATA

INYDG IUNG TAREA SNAP TRSDA TRSPC RATIO ISNOW ISAME LOCAL  
1 1 8.19 0.00 104.10 0.00 0.000 0 1 0

PRECIP DATA

SPFE PMS R6 R12 R24 R48 R72 R96  
0.00 21.00 20.00 94.00 106.00 110.00 0.00 0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.868

LOSS DATA

LROPT STRKR DLTKR RTIOL ERAIN STRKS RTIOK STRTL CMSTL ALSMX RTIMP  
C C.CC 0.00 1.00 0.00 0.00 1.00 1.00 0.10 0.00 0.00

UNIT HYDROGRAPH DATA

TF= 6.47 CP=0.77 NTA= 0

RECESSION DATA

SIRIQ= 16.00 QRCSEN= 16.00 RTIOR= 1.00  
APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TF ARE TC= 8.24 AND R= 3.56 INTERVALS

UNIT HYDROGRAPH 24 END-OF-PERIOD ORDINATES, LAG= 6.46 HOURS, CP= 0.76 VOL= 1.00

39. 139. 268. 403. 526. 605. 629. 600. 386.  
291. 219. 165. 124. 94. 71. 53. 40. 23.  
1/. 13. 10. 7.

END-OF-PERIOD FLOW

MO.DA HR.MN PERIOD RAIN EXCS LCSS COMP Q MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q  
1.01 1.00 1 0.01 0.00 C.01 16. 1.02 22.00 46 0.22 0.12 0.10 8439.  
1.01 2.00 2 0.01 0.00 C.01 16. 1.02 23.00 47 0.22 0.12 0.10 7907.  
1.01 3.00 3 0.01 0.00 C.01 16. 1.03 0.00 48 0.22 0.12 0.10 6883.  
1.01 4.00 4 0.01 0.00 C.01 16. 1.03 1.00 49 0.00 0.00 0.00 5638.  
1.01 5.00 5 0.01 0.00 C.01 16. 1.03 2.00 50 0.00 0.00 0.00 4472.  
1.01 6.00 6 0.01 0.00 C.01 16. 1.03 3.00 51 0.00 0.00 0.00 3697.  
1.01 7.00 7 0.02 0.00 C.02 16. 1.03 4.00 52 0.00 0.00 0.00 2732.

1.01	6.00	8	0.02	0.00	C.02	16.	1.03	5.00	53	0.00	0.00	0.00	2129.
1.01	9.00	9	0.02	0.00	C.02	16.	1.03	6.00	54	0.00	0.00	0.00	1650.
1.01	10.00	10	0.02	0.00	C.02	16.	1.03	7.00	55	0.00	0.00	0.00	1268.
1.01	11.00	11	0.02	0.00	C.02	16.	1.03	8.00	56	0.00	0.00	0.00	964.
1.01	12.00	12	0.02	0.00	C.02	16.	1.03	9.00	57	0.00	0.00	0.00	729.
1.01	13.00	13	0.06	0.00	C.06	16.	1.03	10.00	58	0.00	0.00	0.00	551.
1.01	14.00	14	0.07	0.00	C.07	16.	1.03	11.00	59	0.00	0.00	0.00	418.
1.01	15.00	15	0.08	0.00	C.08	16.	1.03	12.00	60	0.00	0.00	0.00	317.
1.01	16.00	16	0.21	0.00	C.21	16.	1.03	13.00	61	0.00	0.00	0.00	235.
1.01	17.00	17	0.08	0.00	C.08	16.	1.03	14.00	62	0.00	0.00	0.00	172.
1.01	18.00	18	0.06	0.00	C.06	16.	1.03	15.00	63	0.00	0.00	0.00	122.
1.01	19.00	19	0.01	0.00	C.01	16.	1.03	16.00	64	0.00	0.00	0.00	66.
1.01	20.00	20	0.01	0.00	C.01	16.	1.03	17.00	65	0.00	0.00	0.00	43.
1.01	21.00	21	0.01	0.00	C.01	16.	1.03	18.00	66	0.00	0.00	0.00	28.
1.01	22.00	22	0.01	0.00	C.01	16.	1.03	19.00	67	0.00	0.00	0.00	24.
1.01	23.00	23	0.01	0.00	C.01	16.	1.03	20.00	68	0.00	0.00	0.00	22.
1.02	0.00	24	0.01	0.00	C.01	16.	1.03	21.00	69	0.00	0.00	0.00	20.
1.02	1.00	25	0.15	0.00	C.15	16.	1.03	22.00	70	0.00	0.00	0.00	18.
1.02	2.00	26	0.15	0.01	C.14	16.	1.03	23.00	71	0.00	0.00	0.00	17.
1.02	3.00	27	0.15	0.05	C.10	19.	1.04	0.00	72	0.00	0.00	0.00	16.
1.02	4.00	28	0.15	0.05	C.10	26.	1.04	1.00	73	0.00	0.00	0.00	16.
1.02	5.00	29	0.15	0.05	C.10	39.	1.04	2.00	74	0.00	0.00	0.00	16.
1.02	6.00	30	0.15	0.05	C.10	58.	1.04	3.00	75	0.00	0.00	0.00	16.
1.02	7.00	31	0.43	0.33	C.10	94.	1.04	4.00	76	0.00	0.00	0.00	16.
1.02	8.00	32	0.43	0.33	C.10	161.	1.04	5.00	77	0.00	0.00	0.00	16.
1.02	9.00	33	0.43	0.33	C.10	264.	1.04	6.00	78	0.00	0.00	0.00	16.
1.02	10.00	34	0.43	0.33	C.10	404.	1.04	7.00	79	0.00	0.00	0.00	16.
1.02	11.00	35	0.43	0.33	C.10	573.	1.04	8.00	80	0.00	0.00	0.00	16.
1.02	12.00	36	0.43	0.33	C.10	759.	1.04	9.00	81	0.00	0.00	0.00	16.
1.02	13.00	37	1.46	1.36	C.10	988.	1.04	10.00	82	0.00	0.00	0.00	16.
1.02	14.00	38	1.75	1.65	C.10	1321.	1.04	11.00	83	0.00	0.00	0.00	16.
1.02	15.00	39	2.19	2.09	C.10	1805.	1.04	12.00	84	0.00	0.00	0.00	16.
1.02	16.00	40	5.54	5.44	C.10	2604.	1.04	13.00	85	0.00	0.00	0.00	16.
1.02	17.00	41	2.04	1.94	C.10	3799.	1.04	14.00	86	0.00	0.00	0.00	16.
1.02	18.00	42	1.00	1.50	C.10	5213.	1.04	15.00	87	0.00	0.00	0.00	16.
1.02	19.00	43	0.22	0.12	C.10	6617.	1.04	16.00	88	0.00	0.00	0.00	16.
1.02	20.00	44	0.22	0.12	C.10	7763.	1.04	17.00	89	0.00	0.00	0.00	16.
1.02	21.00	45	0.22	0.12	C.10	8406.	1.04	18.00	90	0.00	0.00	0.00	16.

SUM 20.05 16.83 3.21 89994.  
( 509. )( 428. )( 82. )( 2548.34 )

PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
8439.	7588.	3610.	1246.	89977.
239.	215.	102.	35.	2548.
	8.02	16.40	16.98	17.03
	218.90	416.56	431.33	432.64
	3762.	7160.	7414.	7436.
	4641.	8832.	9145.	9172.

CFS  
CMS  
INCHES  
MM  
AC-FT  
THOUS CU M











UNIT HYDROGRAPH 11 END-OF-PERIOD ORDINATES, LAG= 3.09 HOURS, CP= 0.77 VOL= 1.00  
21. 70. 117. 130. 97. 53. 27. 13. 7. 3.  
2.

MO.DA HR.MN PERIOD RAIN EXCS LOSS MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q  
0  
SUM 20.05 16.83 3.21 9269.  
( 509.)( 428.)( 82.)( 262.47)

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COMBINE 2 HYDROGRAPHS AT 900  
ISTAQ ICOMP IECON ITAPE JPLT JPRT INAME ISTAGE IAUTO  
900 2 0 0 0 0 0 0 0 0

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HYDROGRAPH ROUTING  
ROUTE OVER CATKA CREEK DAM  
ISTAQ ICOMP IECON ITAPE JPLT JPRT INAME ISTAGE IAUTO  
900 1 0 0 0 0 0 0 0

ROUTING DATA  
QLCSS CLOSS AVG IRES ISAME IOFT IFMP LSTR  
0.0 0.000 0.00 1 1 0 0 0

NSIPS NSTDL LAG AMSKK X TSK STORA ISPRAT  
1 0 0 0.000 0.000 -1.0 0

CAPACITY= 0. 230. 310. 390. 470. 550. 630. 710. 780. 860.  
940. 1020. 1100. 1180. 1260.

ELEVATION= 856. 864. 866. 868. 870. 872. 874. 876. 878. 880.  
882. 884. 886. 888. 890.

CREL SPLWD CCGW EXPW ELEV COQL CAREA EXPL  
864.0 160.0 3.2 1.5 0.0 0.0 0.0 0.0

DAM DATA  
TOPEL CQGD EXFD DAMHID  
866.0 2.6 1.5 20.

PEAK OUTFLOW IS 13260. AT TIME 49.00 HOURS



500.00 864.00 600.00 878.00 700.00 880.00

STORAGE 0.00 23.41 47.96 73.66 100.52 129.21 160.06 193.05 228.21  
304.91 346.11 389.03 433.69 480.08 528.20 578.06 629.65 684.93

OUTFLOW 0.00 271.60 869.68 1724.96 2827.70 4221.03 5846.80 7701.75 9783.91  
14631.30 17398.63 20388.36 23599.96 27033.45 30689.11 34567.52 38669.46 42712.23

STAGE 860.00 861.05 862.11 863.16 864.21 865.26 866.32 867.37 868.42  
870.53 871.58 872.63 873.68 874.74 875.79 876.84 877.89 878.95

FLOW 0.00 271.60 869.68 1724.96 2827.70 4221.03 5846.80 7701.75 9783.91  
14631.30 17398.63 20388.36 23599.96 27033.45 30689.11 34567.52 38669.46 42712.23

MAXIMUM STAGE IS 870.0

MAXIMUM STAGE IS 874.8

MAXIMUM STAGE IS 876.8

MAXIMUM STAGE IS 878.7

MAXIMUM STAGE IS 882.2

MAXIMUM STAGE IS 885.8

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# SUB-AREA RUNOFF COMPUTATION

SUB AREA-13 RUNOFF  
ISTAQ ICCMP IECON ITAFE JPLI JPRI INAME ISAME ISNOW ISNOX LOCAL  
13 0 0 0 0 0 0 1 0 0 0

## HYDROGRAPH DATA

IHYDC IUHG TAREA SNAF TRSDA TRSPC RATIO ISNOX ISAME ISNOX LOCAL  
1 1 0.84 0.00 104.10 0.00 C.000 0 1 0

## PRECIP DATA

SPFE PMS R6 R12 R24 R48 R72 R96  
C.00 21.00 80.00 94.00 106.00 110.00 C.00 C.00

TRSPC COMPUTED BY THE PROGRAM IS C.868

## LOSS DATA

LROPT STRKR DLTKR RTIOL ERAIN STRKS RTIOK STRIL CNSIL ALSHX RTIMP  
0 C.00 C.00 1.00 C.00 1.00 1.00 1.00 C.00 C.00

## UNIT HYDROGRAPH DATA

TF= 3.11 CP=C.77 NTA= C

## RECESSION DATA



PEAK OUTFLOW IS 27374. AT TIME 49.00 HOURS  
 PEAK OUTFLOW IS 34525. AT TIME 49.00 HOURS  
 PEAK OUTFLOW IS 41720. AT TIME 49.00 HOURS  
 PEAK OUTFLOW IS 56357. AT TIME 49.00 HOURS  
 PEAK OUTFLOW IS 71567. AT TIME 49.00 HOURS

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# HYDROGRAPH ROUTING

## CHANNEL ROUTE THRU SUB AREA-14

ISTAQ	ICGPF	IECON	ITAPE	JPLT	JPRY	INAME	ISTAGE	IAUTO
14	1	0	0	0	0	1	0	0
ROUTING DATA								
QLOSS	CLOSS	AVG	IRIS	ISAME	IOPT	IPMP	LSTR	
C.C	0.000	0.00	1	1	0	0	0	
NSTPS NSTDL LAG AMSKK X TSK STORA ISPRAT								
1	0	0	0.000	0.000	-1.	0	0	

## NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
0.0800	0.0400	0.0200	835.0	860.0	2100.0	0.00700

## CROSS SECTION COORDINATES--STA-ELEV,STA-ELEV--ETC

	100.00	860.00	250.00	850.00	300.00	840.00	310.00	835.00	350.00	835.00
STORAGE	0.00	2.70	5.74	9.11	12.83	17.31	22.75	29.14	36.50	
	54.09	64.32	75.68	88.85	103.89	120.81	139.60	160.28	182.83	
OUTFLOW	0.00	199.85	646.89	1300.32	2177.31	3377.34	4830.92	6554.40	8562.52	
	13488.67	16433.90	19613.31	23159.36	27173.36	31678.53	36703.05	42276.19	48427.26	
STAGE	835.00	836.32	837.63	838.95	840.26	841.58	842.89	844.21	845.53	
	848.16	849.47	850.79	852.10	853.42	854.74	856.05	857.37	858.68	
FLOW	0.00	199.85	646.89	1300.32	2177.31	3377.34	4830.92	6554.40	8562.52	
	13488.67	16433.90	19613.31	23159.36	27173.36	31678.53	36703.05	42276.19	48427.26	

MAXIMUM STAGE IS 842.0  
 MAXIMUM STAGE IS 853.5  
 MAXIMUM STAGE IS 855.5  
 MAXIMUM STAGE IS 857.2  
 MAXIMUM STAGE IS 860.2  
 MAXIMUM STAGE IS 863.2

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# SUB-AREA RUNOFF COMPLETION

## SUB AREA-14 RUNOFF

ISTAQ 14 ICOMP 0 IECON 0 ITAPE 0 JPLI 0 JPRI 0 INAME 1 ISTAGE 0 LAUTO 0

## HYDROGRAPH DATA

INYDG 1 IUHG 1 TAREA 0.37 SNAP 0.00 TRSDA 104.10 TRSPC 0.00 RATIO 0.000 ISNOW 0 ISAME 1 LOCAL 0

## PRECIP DATA

SPFE 0.00 PMS 21.00 R6 80.00 R12 94.00 R24 106.00 R48 110.00 R72 0.00 R96 0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.868

## LOSS DATA

LROPT 0 STKR 0.00 DLTKR 0.00 RTIOL 1.00 ERAIN 0.00 STKS 0.00 RTIOK 1.00 STRTL 1.00 CNSTL 0.10 ALSMX 0.00 RTIME 0.00

## UNIT HYDROGRAPH DATA

TF= 2.88 CP=0.77 NTA= 0

## RECESSION DATA

STPTQ= 1.00 GRCSN= 1.00 RTIOR= 1.00

UNIT HYDROGRAPH 9 END-OF-PERIOD ORDINATES, LAE= 2.87 HOURS, CP= 0.76 VOL= 1.00  
 12. 39. 61. 60. 38. 16. 7. 3. 1.

## END-OF-PERIOD FLOW

MO.DA HR.MN PERIOD RAIN EXCS LCSS COMP Q MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q  
 SUM 20.05 16.83 3.21 4095.  
 ( 509.)( 428.)( 82.)( 115.96)

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COMBINE HYDROGRAPHS

COMBINE 2 HYDROGRAPHS AT 1000  
ISTAQ ICCMP IECON

1000 2 0 ITAPE JPLT JPRT INAME ISTAGE I AUTO  
0 0 0 0 1 0

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PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS  
 FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)  
 AREA IN SQUARE MILES (SQUARE KILOMETERS)

RATIOS APPLIED TO FLOWS

OPERATION	STATION	AREA	PLAN	RATIO 1 C.20	RATIO 2 0.40	RATIO 3 C.50	RATIO 4 0.60	RATIO 5 C.80	RATIO 6 1.00
HYDROGRAPH AT	1	8.78 ( 22.74)	1	2533. ( 57.56)	4066. ( 115.13)	5082. ( 143.91)	6099. ( 172.65)	8132. ( 230.26)	10164. ( 287.82)
HYDROGRAPH AT	1	4.94 ( 12.79)	1	1259. ( 35.66)	2519. ( 71.33)	3149. ( 89.16)	3778. ( 106.99)	5038. ( 142.65)	6297. ( 178.32)
2 COMBINED	100	13.72 ( 35.53)	1	3251. ( 92.05)	6502. ( 184.10)	8127. ( 230.13)	9752. ( 276.16)	13003. ( 368.21)	16254. ( 460.26)
ROUTED TO	3	13.72 ( 35.53)	1	3241. ( 91.77)	6496. ( 183.94)	8135. ( 230.36)	9756. ( 276.26)	13020. ( 368.70)	16283. ( 461.07)
HYDROGRAPH AT	3	5.85 ( 15.15)	1	1400. ( 39.65)	2800. ( 79.30)	3500. ( 99.12)	4200. ( 118.94)	5601. ( 158.59)	7001. ( 198.24)
2 COMBINED	200	19.57 ( 50.69)	1	4641. ( 131.42)	9296. ( 263.24)	11635. ( 329.48)	13957. ( 395.20)	18621. ( 527.29)	23283. ( 659.31)
ROUTED TO	4	19.57 ( 50.69)	1	4549. ( 128.82)	9100. ( 259.37)	11456. ( 324.41)	13773. ( 390.00)	18461. ( 522.75)	23084. ( 653.66)
HYDROGRAPH AT	4	19.66 ( 50.92)	1	3840. ( 108.72)	7679. ( 217.45)	9599. ( 271.81)	11519. ( 326.17)	15358. ( 434.90)	19158. ( 543.62)
2 COMBINED	300	39.23 ( 101.60)	1	8336. ( 236.06)	16669. ( 472.01)	20835. ( 589.98)	24996. ( 707.81)	33378. ( 945.15)	41730. ( 1181.66)
ROUTED TO	5	39.23 ( 101.60)	1	6353. ( 179.90)	13316. ( 377.08)	16759. ( 474.56)	20180. ( 571.43)	27107. ( 767.57)	34130. ( 966.46)
HYDROGRAPH AT	5	22.20 ( 57.50)	1	5288. ( 149.75)	10577. ( 299.50)	13221. ( 374.38)	15865. ( 449.25)	21154. ( 599.00)	26442. ( 748.75)
2 COMBINED	400	61.43 ( 159.10)	1	10302. ( 291.72)	21416. ( 606.44)	26971. ( 763.74)	32520. ( 920.86)	43615. ( 1235.03)	55037. ( 1558.46)
ROUTED TO	6	61.43 ( 159.10)	1	6112. ( 173.07)	12579. ( 356.19)	15267. ( 432.33)	18366. ( 520.08)	25440. ( 720.37)	33229. ( 940.94)
HYDROGRAPH AT	6	21.55	1	4307.	8615.	10769.	12922.	17230.	21537.



HYDROGRAPH AT	7	( 55.76)	( 121.97)	( 243.95)	( 304.93)	( 365.92)	( 487.90)	( 609.87)
		( 32.58)	( 70.51)	( 141.03)	( 176.28)	( 211.54)	( 282.05)	( 352.57)
3 COMBINED	500	( 95.54)	( 113.16)	( 228.35)	( 287.18)	( 340.25)	( 454.23)	( 577.55)
		( 247.45)	( 320.43)	( 646.60)	( 813.20)	( 963.49)	( 1286.23)	( 1635.44)
ROUTED TO	8	( 95.54)	( 95.32)	( 199.11)	( 245.88)	( 299.83)	( 410.19)	( 527.73)
		( 247.45)	( 269.92)	( 563.81)	( 707.58)	( 849.01)	( 1161.54)	( 1496.38)
HYDROGRAPH AT	6	( 10.97)	( 23.50)	( 47.00)	( 58.76)	( 70.51)	( 94.01)	( 117.51)
		( 28.41)	( 66.55)	( 133.10)	( 166.38)	( 199.65)	( 266.20)	( 332.75)
2 COMBINED	600	( 106.51)	( 107.11)	( 223.84)	( 282.79)	( 340.07)	( 462.98)	( 593.04)
		( 275.86)	( 303.31)	( 633.83)	( 800.77)	( 962.97)	( 1311.00)	( 1679.30)
ROUTED TO	9	( 106.51)	( 100.49)	( 207.28)	( 259.73)	( 312.54)	( 426.78)	( 551.40)
		( 275.86)	( 284.57)	( 586.96)	( 735.46)	( 885.00)	( 1208.51)	( 1561.39)
HYDROGRAPH AT	9	( 7.64)	( 15.14)	( 30.27)	( 37.84)	( 45.41)	( 60.54)	( 75.68)
		( 19.79)	( 42.86)	( 85.72)	( 107.15)	( 128.58)	( 171.44)	( 214.30)
HYDROGRAPH AT	10	( 9.01)	( 18.34)	( 36.67)	( 45.84)	( 55.01)	( 73.35)	( 91.69)
		( 23.34)	( 51.93)	( 103.85)	( 129.81)	( 155.78)	( 207.70)	( 259.63)
3 COMBINED	700	( 123.16)	( 115.63)	( 237.30)	( 299.07)	( 360.82)	( 450.77)	( 631.68)
		( 318.98)	( 327.43)	( 671.95)	( 846.88)	( 1021.72)	( 1389.72)	( 1788.73)
ROUTED TO	11	( 123.16)	( 115.01)	( 236.37)	( 297.63)	( 359.11)	( 488.38)	( 628.86)
		( 318.98)	( 325.69)	( 669.34)	( 842.78)	( 1016.89)	( 1382.92)	( 1780.72)
HYDROGRAPH AT	11	( 7.57)	( 17.67)	( 35.34)	( 44.17)	( 53.00)	( 70.67)	( 88.34)
		( 19.61)	( 50.03)	( 100.06)	( 125.07)	( 150.09)	( 200.12)	( 250.14)
HYDROGRAPH AT	12	( 8.19)	( 16.88)	( 33.76)	( 42.20)	( 50.64)	( 67.52)	( 84.39)
		( 21.21)	( 47.80)	( 95.59)	( 119.49)	( 143.39)	( 191.18)	( 238.98)
3 COMBINED	800	( 138.92)	( 132.58)	( 273.04)	( 344.41)	( 416.07)	( 562.37)	( 715.03)
		( 359.80)	( 375.43)	( 773.15)	( 975.27)	( 1178.17)	( 1592.44)	( 2024.74)
ROUTED TO	13	( 138.92)	( 132.52)	( 273.20)	( 344.64)	( 416.40)	( 562.58)	( 714.79)
		( 359.80)	( 375.25)	( 773.62)	( 975.91)	( 1179.12)	( 1593.05)	( 2024.07)
HYDROGRAPH AT	13	( 6.84)	( 27.5)	( 55.1)	( 68.8)	( 82.6)	( 110.1)	( 137.7)
		( 2.18)	( 7.80)	( 15.60)	( 19.49)	( 23.39)	( 31.19)	( 38.99)
2 COMBINED	900	( 139.76)	( 132.75)	( 273.66)	( 345.22)	( 417.10)	( 563.51)	( 715.95)
		( 361.77)	( 375.91)	( 774.93)	( 977.55)	( 1181.09)	( 1595.67)	( 2027.34)
ROUTED TO	900	( 139.76)	( 132.60)	( 273.74)	( 345.25)	( 417.20)	( 563.57)	( 715.67)



RATIO	FLOW, CFS	STAGE, FT	TIME HOURS
C.20	6112.	945.3	52.00
C.40	12579.	948.6	51.00
C.50	15267.	949.8	52.00
C.60	18366.	950.8	52.00
C.80	25440.	952.3	51.00
1.00	33229.	953.7	51.00

PLAN 1 STATION 8

RATIO	MAXIMUM FLOW, CFS	MAXIMUM STAGE, FT	TIME HOURS
C.20	9532.	928.9	51.00
C.40	19911.	932.7	50.00
C.50	24988.	934.1	50.00
C.60	29983.	935.3	50.00
C.80	41019.	937.6	50.00
1.00	52773.	939.6	50.00

PLAN 1 STATION 9

RATIO	MAXIMUM FLOW, CFS	MAXIMUM STAGE, FT	TIME HOURS
C.20	10049.	929.6	52.00
C.40	20728.	933.7	52.00
C.50	25973.	935.1	52.00
C.60	31254.	936.3	52.00
C.80	42678.	938.5	52.00
1.00	55140.	940.4	51.00

PLAN 1 STATION 11

RATIO	MAXIMUM FLOW, CFS	MAXIMUM STAGE, FT	TIME HOURS
C.20	11501.	904.3	51.00
C.40	23637.	907.5	51.00
C.50	29763.	908.8	51.00
C.60	35911.	909.9	50.00
C.80	48838.	912.2	51.00
1.00	62886.	914.8	51.00

PLAN 1 STATION 13

RATIO	MAXIMUM FLOW, CFS	MAXIMUM STAGE, FT	TIME HOURS
C.20	13252.	870.0	49.00
C.40	27320.	874.8	49.00
C.50	34464.	876.8	49.00

U-6U  
C-8C  
1.00

41840.  
56258.  
71479.

878.7  
882.2  
885.8

49.00  
49.00  
49.00



# SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

ELEVATION  
STORAGE  
OUTFLOW

INITIAL VALUE  
856.00  
0.  
0.

SPILLWAY CREST  
864.00  
231.  
0.

TOP OF DAM  
866.00  
310.  
1448.

RATIO  
OF  
PMF

MAXIMUM  
RESERVOIR  
W.S. ELEV

MAXIMUM  
DEPTH  
OVER DAM

MAXIMUM  
STORAGE  
AC-FT

MAXIMUM  
OUTFLOW  
CFS

DURATION  
OVER TOP  
HOURS

TIME OF  
MAX OUTFLOW  
HOURS

TIME OF  
FAILURE  
HOURS

PLAN 1

STATION

14

RATIO  
C.20  
C.40  
C.50  
C.60  
C.80  
1.00

MAXIMUM  
FLOW, CFS  
13256.  
27371.  
34521.  
41730.  
56324.  
71563.

MAXIMUM  
STAGE, FT  
848.0  
853.5  
855.5  
857.2  
860.2  
863.2

TIME  
HOURS  
49.00  
49.00  
49.00  
49.00  
49.00  
49.00

[illegible]

[illegible]

## A1 OATKA CREEK DAM

PAGE 0003

(C072)	Y7	100	970	1750	950	2650	940	2700	933	2750	933	
(C073)	Y7	2800	940	3600	950	4500	950					
(C079)	K1		6	6				1				
(C080)	K1		SUB AREA-6 RUNOFF									
(C081)	M	1	1	21.55	0	104.1	0	0	0	1		
(C082)	F	6	21.6	80	94	106	110					
(C083)	T	0	0	0	0	0	0	1	0.1			
(C084)	M	6.80	.77	0								
(C085)	X	43	43	1								
(C086)	K1	0	7	0	0	0	0	1				
(C087)	K1		SUB AREA-7 RUNOFF									
(C088)	M	1	1	12.58	0	104.1	0	0	0	1		
(C089)	F	0	21.0	80	94	106	110					
(C090)	T	0	0	0	0	0	0	1	0.1			
(C091)	M	6.85	.77	0								
(C092)	X	25	25	1								
(C093)	K1	3	500	0	0	0	0	1				
(C094)	K1		COMBINE-3 HYDROGRAPHS AT SCC									
(C095)	K1	1	8	0	0	0	0	1				
(C096)	K1		CHANNEL ROUTE THRU SUB AREA-8									
(C097)	Y	0	0	0	1	1						
(C098)	Y1	1	0	0	0	0	0	-1				
(C099)	Y6	.08	.04	.08	918	950	30200	-0007				
(C100)	Y7	100	950	700	930	1100	920	1125				
(C101)	Y7	1200	920	2100	940	3000	950		-918	1175	918	
(C102)	K1	0	0	0	0	0	0	1				
(C103)	K1		SUB AREA-8 RUNOFF									
(C104)	M	1	1	10.57	0	104.1	0	0	0	1		
(C105)	F	0	21.0	80	94	106	110					
(C106)	T	0	0	0	0	0	0	1	0.1			
(C107)	M	6.21	.77	0								
(C108)	X	22	22	1								
(C109)	K1	2	600	0	0	0	0	1				
(C110)	K1		COMBINE 2 HYDROGRAPHS AT 6CC									
(C111)	K1	1	9	0	0	0	0	1				
(C112)	K1		CHANNEL ROUTE THRU SUB AREA-9									
(C113)	Y	0	0	0	1	1	0					
(C114)	Y1	1	0	0	0	0	0	-1				



(0115)	Y6	1.08	0.4	-0.8	911	950	20500	-0.004	919	1250	919	
(0116)	Y7	1.00	950	7.04	930	1200	920	1210				
(0117)	Y7	1.00	520	1000	940	3200	930					
(0118)	K1							1				
(0119)	K1			SUB AREA-9 RUNOFF								
(0120)	M	1	1	7.04	0	104.1	0	0	0	1		
(0121)	F	0	21.0	80	94	106	110					
(0122)	T	0	0	0	0	0	0	1	0.1			
(0123)	M	6.88	-77									
(0124)	X	15	15	1								
(0125)	K1	0	10	0	0	0	0	1				
(0126)	K1			SUB AREA-10 RUNOFF								
(0127)	M	1	1	9.01	0	104.1	0	0	0	1		
(0128)	F	0	21.0	80	94	106	110					
(0129)	T	0	0	0	0	0	0	1	0.1			
(0130)	M	6.00	-77									
(0131)	X	18	18	1								
(0132)	K1	5	700	0	0	0	0	1				
(0133)	K1			COMBINE 3 HYDROGRAPHS AT 700								
(0134)	K1	1	11	0	0	0	0	1				
(0135)	K1			CHANNEL ROUTE THRU SUB AREA-11								
(0136)	T	0	0	0	1	1	0	-1				
(0137)	Y1	1	0	0	0	0	0					
(0138)	Y6	0.04	0.4	-0.8	896	910	11600	-0.002	896	850	896	
(0139)	Y7	100	910	500	900	750	898	760				
(0140)	Y7	800	898	1000	900	1100	910					
(0141)	K1	0	11	0	0	0	0	1				
(0142)	K1			SUB AREA-11 RUNOFF								
(0143)	M	1	1	7.57	0	104.1	0	0	0	1		
(0144)	F	0	21.0	80	94	106	110					
(0145)	T	0	0	0	0	0	1	0.1				
(0146)	M	5.99	-77									
(0147)	X	15	15	1								
(0148)	K1	0	10	0	0	0	1					
(0149)	K1			SUB AREA-12 RUNOFF								
(0150)	M	1	1	8.19	0	104.1	0	0	0	1		
(0151)	F	0	21.0	80	94	106	110					
(0152)	T	0	0	0	0	0	0	1	0.1			



A1

LATAK CREEK DAM

PAGE 0006

(0191)	Y6	-0.4	-0.4	835	800	2100	-007		
(0192)	Y7	100	860	850	300	840	310		
(0193)	Y7	360	840	850	500	860			835
(0194)	K	0	14	0	0	0	1		
(0195)	K1		SUB AREA-14 RUNOFF						
(0196)	M	1	1	0	104.1	0	0		1
(0197)	F	0	21.0	94	106	110			
(0198)	T	0	0	0	0	0	1		0.1
(0199)	M	2.80	-77						
(0200)	A	1	1						
(0201)	K	0	1000	0	0	0	1		
(0202)	K1		COMBINE 2 HYDROGRAPHS AT 1000						
(0203)	K	99							
(0204)	A								
(0205)	A								
(0206)	A								
(0207)	A								
(0208)	A								

\*\*\*\*\*  
 FLOOD HYDROGRAPH PACKAGE (HEC-1)  
 DAM SAFETY VERSION JULY 1978  
 LAST MODIFICATION 26 FEB 79  
 \*\*\*\*\*

RLN DATE? MON, SEP 17 1979  
 TIME? 13:41:45

GATKA CREEK DAM  
 HEC-1DB  
 PMF - DAM BREAK ANALYSIS

JOB SPECIFICATION									
NQ	NHR	NMIN	IDAY	IHR	I'IN	METRC	IPLT	IPRT	INSTAN
9C	1	0	0	0	0	0	0	4	0
			JCFER	NMT	LROPT	TRACE			
			5	0	0	0			

MULTI-PLAN ANALYSES TO BE PERFORMED  
 NPLAN= 4 NRTIO= 2 LRTIO= 1

RTIOS= 0.5C 1.0C

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SUB-AREA RUNOFF COMPUTATION

SUB AREA-1 RUNOFF									
ISTAQ	ICOMP	IECON	ITAFE	JPLT	JFRT	INAME	ISTAGE	IAUTO	
1	0	0	0	0	0	1	0	0	

HYDROGRAPH DATA

IHYDG	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIC	ISNOW	ISAME	LOCAL
1	1	8.7%	0.0C	140.10	0.0C	0.0CC	0	1	0

PRECIP DATA

SPE	FMS	R6	R12	R24	R48	R72	R96
0.0C	21.0C	0C.0C	94.00	10C.0C	11C.0C	C.00	C.00

TRSPC COMPUTED BY THE PROGRAM IS 0.375

LOSS DATA

IRIFT	SIRKR	DLTKR	RTIOL	RTIOL	RTIOL	RTIOL	RTIOL	RTIOL	RTIOL
0	C.0C	C.0C	1.0C	C.0C	0.0C	1.00	1.0C	0.1C	0.1C

UNIT HYDROGRAPH DATA

TF= 5.56 CP=0.77 NTA= C

RECESSION DATA

SIRTK= 10.0C GRCSN= 10.00 RTIOR= 1.00



UNIT HYDROGRAPH 21 END-OF-PERIOD ORDINATES, LAG= 5.58 HOURS, CP= 0.77 VOL= 1.00  
 59. 211. 401. 592. 731. 780. 738. 597. 432. 312.  
 225. 163. 117. 85. 61. 44. 32. 23. 17. 12.  
 9.

MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q PC.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q  
 SUM 20.21 16.99 3.22 97428.  
 ( 513.)( 431.)( 82.)( 2758.85)

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SUB-AREA RUNOFF COMPUTATION

SUB AREA-2 RUNOFF  
 ISTAQ 1

HYDROGRAPH DATA  
 IHYDG 1 IUMG 1 TAREA 4.94 SNAP 0.00 TRSDA 140.10 TRSPC 0.00  
 IECON 0 ITAPE 0 JPLT 0 JPRY 0 INAME 1 ISAME 1 LOCAL 0

PRECIP DATA  
 SPFC FMS R1 R12 R24 R48 R72 R96  
 0.00 21.00 20.00 94.00 106.00 110.00 0.00 0.00

TRSPC COMPUTED BY THE PRGGRAPH IS 0.875

LOSS DATA  
 LROFT STKR DLTKR RTIOL ERAIN STRKS RTIOK SIRTJ CNSTL ALSPX RTIME  
 0.00 0.00 1.00 1.00 0.00 0.00 1.00 0.10 0.00 0.00

UNIT HYDROGRAPH DATA  
 TF= 4.88 CP=0.77 NTA= 0

RECESSION DATA  
 STRTC= 10.00 GRCSN= 10.00 RTIOR= 1.00

UNIT HYDROGRAPH 18 END-OF-PERIOD ORDINATES, LAG= 4.85 HOURS, CP= 0.76 VOL= 1.00  
 47. 164. 303. 435. 500. 484. 386. 268. 185. 127.  
 60. 42. 29. 20. 14. 9. 7.

MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q PC.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q  
 SUM 20.21 16.99 3.22 54775.  
 ( 513.)( 431.)( 82.)( 1551.05)

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# COMBINE HYDROGRAPHS

## COMBINE 2 HYDROGRAPHS AT 100

ISTAG ICOMP IECON ITAPE JPLT JPRT INAME ISTAGE IAUTO  
100 2 0 0 0 0 1 0

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## HYDROGRAPH ROUTING

## CHANNEL ROUTE THRU SLB AREA-3

ISTAG ICOMP IECON ITAPE JPLT JPRT INAME ISTAGE IAUTO  
3 1 0 0 0 0 1 0

## ALL PLANS HAVE SAME

## ROUTING DATA

QLOSS CLOSS AVG IRES ISAME IOFT IFMP LSTR  
0.0 0.000 0.00 1 1 0 0  
NSTPS NSTDL LAG AMSKK X TSK STORA ISPRAT  
1 0 0 0.000 0.000 -1. 0

## NORMAL DEPTH CHANNEL ROUTING

GN(1) GN(2) GN(3) ELNVT ELMAX RLNTH SEL  
0.000 0.000 0.000 1139.0 1160.0 11000. 0.01500

## CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

100.00 1160.00 300.00 1150.00 399.00 1140.00 400.00 1139.00 405.00 1139.00  
406.00 1140.00 900.00 1150.00 950.00 1160.00

STORAGE	775.85	1.78	14.63	45.76	95.18	162.90	248.91	353.21	475.80
CUTFLOW	21667.97	29231.83	37915.88	47704.36	58591.05	70576.48	83665.67	97866.36	113188.63
STAGE	1139.00	1140.11	1141.21	1142.32	1143.42	1144.53	1145.63	1146.74	1147.84
FLOW	0.00	27.91	170.32	602.69	1465.41	2876.76	4942.88	7761.74	11425.18
	21667.97	29231.83	37915.88	47704.36	58591.05	70576.48	83665.67	97866.36	113188.63

MAXIMUM STAGE IS 1146.8

MAXIMUM STAGE IS 1149.0







MAXIMUM STAGE IS 1004.4  
 MAXIMUM STAGE IS 1006.8  
 MAXIMUM STAGE IS 1004.4  
 MAXIMUM STAGE IS 1006.8  
 MAXIMUM STAGE IS 1004.4  
 MAXIMUM STAGE IS 1006.8  
 MAXIMUM STAGE IS 1004.4  
 MAXIMUM STAGE IS 1006.8

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# SUB-AREA RUNOFF COMPUTATION

## SUB AREA-4 RUNOFF

ISTAG 4 IECON 0 ITAPE 0 JPLT 0 JFRT 0 INAME 1 ISTAGE 0 IAUTO 0

## HYDROGRAPH DATA

INAME 1 ISAME 1 ISNOW 0 RATIO 0.000

## PRECIP DATA

R6 R12 R24 R48 R72 R96  
 0.00 21.00 0.00 104.00 104.00 110.00 0.00 0.00

TRNSFC COMPUTED BY THE PROGRAM IS 0.568

## LOSS DATA

LROPT 0 STRKR 0.00 DLTKR 0.00 RTIOL 1.00 ERAIN 0.00 STRKS 0.00 RTIOK 1.00 STRTL 1.00 CNSTL 0.10 ALSMX 0.00 RTIFF 0.00

## UNIT HYDROGRAPH DATA

TF= 7.08 CP=0.77 NTA= 0

## RECESSION DATA

STRTC= 40.00 GRCSN= 40.00 RTIOR= 1.00

## UNIT HYDROGRAPH 26 END-OF-PERIOD ORDINATES, LAG= 7.02 HOURS, CP= 0.76 VOL= 1.00

78. 203. 540. 1101. 1302. 1345. 1385. 1252. 1019.  
 128. 610. 472. 366. 283. 219. 170. 102. 79.  
 61. 47. 36. 28. 22. 17.

## END-OF-PERIOD FLOW

NO. DA HR. MN PERIOD RAIN EXCS LOSS COMP Q FU. DA HR. MN PERIOD RAIN EXCS LOSS COMP C

SUM 20.05 16.56 3.49 212576.  
( 509.)( 421.)( 89.)( 6019.48)

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COMBINE HYDROGRAPHS

COMBINE 2 HYDROGRAPHS AT 300

ISTAQ	ICOMP	IECON	ITAFE	JPLT	JPRT	INAME	ISTAGE	IAUTO
300	2	0	0	0	0	1	0	0

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HYDROGRAPH ROUTING

CHANNEL ROUTE THRU SUB AREA-5

ISTAQ	ICOMP	IECON	ITAFE	JPLT	JPRT	INAME	ISTAGE	IAUTO
5	1	0	0	0	0	1	0	0

ALL FLANS HAVE SAME

ROUTING DATA

QLOSS	CLOSS	AVG	AVG	ELMAX	ELNVT	GN(2)	GN(3)	SEL
0.0	0.000	0.00	0.00	1000.0	949.0	0.0400	0.0800	0.00100

QLOSS	CLOSS	AVG	AVG	ELMAX	ELNVT	GN(2)	GN(3)	SEL
0.0	0.000	0.00	0.00	1000.0	949.0	0.0400	0.0800	0.00100

QLOSS	CLOSS	AVG	AVG	ELMAX	ELNVT	GN(2)	GN(3)	SEL
0.0	0.000	0.00	0.00	1000.0	949.0	0.0400	0.0800	0.00100

NORMAL DEPTH CHANNEL ROUTING

QLOSS	CLOSS	AVG	AVG	ELMAX	ELNVT	GN(2)	GN(3)	SEL
0.0	0.000	0.00	0.00	1000.0	949.0	0.0400	0.0800	0.00100

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

QLOSS	CLOSS	AVG	AVG	ELMAX	ELNVT	GN(2)	GN(3)	SEL
0.0	0.000	0.00	0.00	1000.0	949.0	0.0400	0.0800	0.00100

STORAGE	QLOSS	CLOSS	AVG	AVG	ELMAX	ELNVT	GN(2)	GN(3)	SEL
22896.39	37200.14	44537.00	51981.30	59541.04	67216.00	75006.48	82912.27	90933.41	99069.91

OUTFLOW	QLOSS	CLOSS	AVG	AVG	ELMAX	ELNVT	GN(2)	GN(3)	SEL
97107.48	195179.50	255855.94	323830.13	358852.88	480746.50	569368.03	664606.13	766367.88	874580.00

STAGE	QLOSS	CLOSS	AVG	AVG	ELMAX	ELNVT	GN(2)	GN(3)	SEL
970.47	949.00	951.68	954.37	957.05	959.74	962.42	965.11	967.79	970.47

FLOW	QLOSS	CLOSS	AVG	AVG	ELMAX	ELNVT	GN(2)	GN(3)	SEL
997.32	975.84	978.53	981.21	983.89	986.50	989.26	991.95	994.63	997.32

FLOW	QLOSS	CLOSS	AVG	AVG	ELMAX	ELNVT	GN(2)	GN(3)	SEL
97107.48	195179.50	255855.94	323830.13	358852.88	480746.50	569368.03	664606.13	766367.88	874580.00

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100
195179.56	255859.94	323830.13	396852.88	480746.56	569368.63	664606.13	766367.88	874580.00																																																																																																		

MAXIMUM STAGE IS 960.4

MAXIMUM STAGE IS 964.0

MAXIMUM STAGE IS 96E.4

MAXIMUM STAGE IS 964.C

MAXIMUM STAGE IS 960.4

MAXIMUM STAGE IS 964.0

MAXIMUM STAGE IS 960.4

MAXIMUM STAGE IS 964.C

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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## SUB-AREA RUNOFF COMPUTATION

SUB AREA-5 RUNOFF

ISTAG	ICCP	IECON	ITAFE	JPLT	JFTT	INAME	ISTAGE	IAUTO
5	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

ISAME	ISNOW	RATIC	TRSPC	TRSDA	SNAP	TAREA	IUHG	INHYDG
1	0	0.000	0.00	140.10	0.00	22.20	1	1

PRECIP DATA

	R96	R72	R48	R24	R12	R0	FMS	SFFE
	C.00	C.00	110.00	104.00	94.00	80.00	21.00	C.00

TRNSFC COMPUTED BY THE PROGRAM IS 0.875

LOSS DATA

LRPCT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIME
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.10	0.00	0.00

UNIT HYDROGRAPH DATA  
TF= 5.32 CP=0.77 NTA= 0

## RECESSION DATA

```
STRIG= 44.CC  GRCSN= 44.CC  RTIOR= 1.CC
```

UNIT HYDROGRAPH 1% END-OF-PERIOD ORDINATES, LAG= 5.32 HOURS, CP= 0.77 VOL= 1.00									
166.	585.	1104.	1611.	1964.	2065.	1910.	1497.	1041.	724.
503.	350.	245.	169.	118.	82.	57.	40.	27.	

DATE	HEAVY LIFTED	DATE	EXPS	EXPS	END-OF-PERIOD FLOW	DATE	EXPS	EXPS
01/01/01	1000	01/01/01	1000	1000	1000	01/01/01	1000	1000
02/01/01	1000	02/01/01	1000	1000	1000	02/01/01	1000	1000
03/01/01	1000	03/01/01	1000	1000	1000	03/01/01	1000	1000
04/01/01	1000	04/01/01	1000	1000	1000	04/01/01	1000	1000
05/01/01	1000	05/01/01	1000	1000	1000	05/01/01	1000	1000
06/01/01	1000	06/01/01	1000	1000	1000	06/01/01	1000	1000
07/01/01	1000	07/01/01	1000	1000	1000	07/01/01	1000	1000
08/01/01	1000	08/01/01	1000	1000	1000	08/01/01	1000	1000
09/01/01	1000	09/01/01	1000	1000	1000	09/01/01	1000	1000
10/01/01	1000	10/01/01	1000	1000	1000	10/01/01	1000	1000
11/01/01	1000	11/01/01	1000	1000	1000	11/01/01	1000	1000
12/01/01	1000	12/01/01	1000	1000	1000	12/01/01	1000	1000
01/01/02	1000	01/01/02	1000	1000	1000	01/01/02	1000	1000
02/01/02	1000	02/01/02	1000	1000	1000	02/01/02	1000	1000
03/01/02	1000	03/01/02	1000	1000	1000	03/01/02	1000	1000
04/01/02	1000	04/01/02	1000	1000	1000	04/01/02	1000	1000
05/01/02	1000	05/01/02	1000	1000	1000	05/01/02	1000	1000
06/01/02	1000	06/01/02	1000	1000	1000	06/01/02	1000	1000
07/01/02	1000	07/01/02	1000	1000	1000	07/01/02	1000	1000
08/01/02	1000	08/01/02	1000	1000	1000	08/01/02	1000	1000
09/01/02	1000	09/01/02	1000	1000	1000	09/01/02	1000	1000
10/01/02	1000	10/01/02	1000	1000	1000	10/01/02	1000	1000
11/01/02	1000	11/01/02	1000	1000	1000	11/01/02	1000	1000
12/01/02	1000	12/01/02	1000	1000	1000	12/01/02	1000	1000
01/01/03	1000	01/01/03	1000	1000	1000	01/01/03	1000	1000
02/01/03	1000	02/01/03	1000	1000	1000	02/01/03	1000	1000
03/01/03	1000	03/01/03	1000	1000	1000	03/01/03	1000	1000
04/01/03	1000	04/01/03	1000	1000	1000	04/01/03	1000	1000
05/01/03	1000	05/01/03	1000	1000	1000	05/01/03	1000	1000
06/01/03	1000	06/01/03	1000	1000	1000	06/01/03	1000	1000
07/01/03	1000	07/01/03	1000	1000	1000	07/01/03	1000	1000
08/01/03	1000	08/01/03	1000	1000	1000	08/01/03	1000	1000
09/01/03	1000	09/01/03	1000	1000	1000	09/01/03	1000	1000
10/01/03	1000	10/01/03	1000	1000	1000	10/01/03	1000	1000
11/01/03	1000	11/01/03	1000	1000	1000	11/01/03	1000	1000
12/01/03	1000	12/01/03	1000	1000	1000	12/01/03	1000	1000
01/01/04	1000	01/01/04	1000	1000	1000			

SUM 20.21 16.70 3.50 242088.  
( 513.)( 424.)( 89.)( 6855.16)

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# COMBINE HYDROGRAPHS

## COMBINE 2 HYDROGRAPHS AT 400

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
400	2	0	0	0	0	1	0	0

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# HYDROGRAPH ROUTING

## CHANNEL ROUTE THRU SUB-AREA-6

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
6	1	0	0	0	0	1	0	0

ALL PLANS HAVE SAME

## ROUTING DATA

GLSS	CLASS	AVG	IRIS	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTFS	NSTD	LAG	AMSKK	X	STOR	ISPRAT
1	0	0	0.000	0.000	-1.	0

## NORMAL DEPTH CHANNEL ROUTING

GN(1)	GN(2)	GN(3)	ELNVT	ELMAX	RLNTH	SEL
0.0800	0.0400	0.0800	933.0	970.0	46000.	0.00030

## CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

STA	ELEV	STA	ELEV	STA	ELEV
100.00	970.00	1750.00	950.00	2650.00	940.00
2800.00	940.00	3600.00	950.00	4500.00	950.00

STORAGE	ELNVT	ELMAX	RLNTH	SEL	STOR	ISPRAT
10746.38	131.42	320.04	565.87	920.09	1844.74	3450.11
	24985.97	31555.91	38456.20	45686.85	53247.84	61139.19

OUTFLOW	ELNVT	ELMAX	RLNTH	SEL	STOR	ISPRAT
26230.09	109.55	393.45	869.85	1638.44	2962.67	5059.57
	37743.18	51508.41	67492.28	85686.00	106095.28	128735.09

STAGE	ELNVT	ELMAX	RLNTH	SEL	STOR	ISPRAT
933.00	934.95	936.89	938.84	940.79	942.74	944.68
952.47	954.42	956.37	958.31	960.26	962.21	964.16

ELNVT	ELMAX	RLNTH	SEL	STOR	ISPRAT
970.00	972.00	974.00	976.00	978.00	980.00



FLOW 26250.04 37743.18 51508.41 67492.28 85686.00 106095.28 128735.09 153626.69 180795.75

MAXIMUM STAGE IS	949.8
MAXIMUM STAGE IS	953.7
MAXIMUM STAGE IS	949.8
MAXIMUM STAGE IS	953.7
MAXIMUM STAGE IS	949.8
MAXIMUM STAGE IS	953.7
MAXIMUM STAGE IS	949.8
MAXIMUM STAGE IS	953.7

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SUB-AREA RUNOFF COMPUTATION

SUB AREA-6 RUNOFF

ISTAQ	ICOMP	IECON	ITAFE	JPLI	JPRI	INAME	ISTAGE	IAUTO	
0	0	0	0	0	0	1	0	0	
HYDROGRAPH DATA									
IHYDG	IUNG	TAREA	SNAF	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	21.53	0.00	104.10	0.00	0.000	0	1	0
PRECIP DATA									
SPFE	PMS	R6	R12	R24	R48	R72	R96		
0.00	21.00	80.00	94.00	106.00	110.00	0.00	0.00		
TRSPC COMPUTED BY THE PROGRAM IS 0.868									

TRSPC COMPUTED BY THE PROGRAM IS 0.868

LROPT	STKR	DLTKR	RTIOL	RTIOL	ERAIN	STRS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	0.10	0.00	0.00

UNIT HYDROGRAPH DATA  
TF= 6.80 CP=0.77 NTA= 0

RECESSION DATA  
STRTQ= 43.00 GRCSN= 43.00 RTIOR= 1.00

UNIT HYDROGRAPH 24 END-OF-PERIOD ORIGINATES, LAG= 6.75 HOURS, CP= 0.77 VOL= 1.00									
73.	334.	642.	579.	1288.	1502.	1584.	1540.	1337.	1052.
81.	624.	481.	371.	285.	220.	169.	130.	101.	77.
91.	46.	35.	27.	21.	16.				

MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP G END-OF-PERIOD FLOW MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP G

SUM 20.05 16.83 3.21 236738.  
( 509.)( 428.)( 82.)( 6703.67)

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SUB-AREA RUNOFF COMPUTATION

SUB AREA-7 RUNOFF  
ISTAQ 7

IHYDG IUNG TAREA SNAP TRSDA TRSPC RATIO ISNOW ISAME LOCAL

1 1 12.58 6.00 104.10 0.00 0.000 0 1 0

PRECIP DATA  
R2 R24 R48 R72 R96  
C.CC 21.00 80.00 106.00 110.00 C.00 C.00

TRSPC COMPUTED BY THE PROGRAM IS C.266

LOSS DATA  
LRGT STKR DLTK RTCL ERIN STKS RTCK STRTL CNSTL ALSMX RTIMP

0 0.00 0.00 1.00 0.00 0.00 1.00 1.00 0.10 C.CC 0.00

UNIT HYDROGRAPH DATA  
TF= 6.89 CP=0.77 NTA= 0

RECESSION DATA  
STR1Q= 25.00 QRCN= 25.00 RTIOR= 1.00

UNIT HYDROGRAPH 26 END-OF-PERIOD ORDINATES, LAG= 6.86 HOURS, CP= 0.76 VOL= 1.00

53. 190. 368. 558. 736. 861. 912. 891. 781. 620.  
401. 373. 250. 174. 135. 105. 63. 49.  
30. 23. 18. 14. 11.

MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP G END-OF-PERIOD FLOW MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP G

SUM 20.05 16.83 3.21 138226.  
( 509.)( 428.)( 82.)( 3914.12)

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COMBINE HYDROGRAPHS

COMBINE 7 HYDROGRAPHS AT 500

ISTAQ	ICOMP	IECON	ITAFE	JPLT	JPRT	INAME	ISTAGE	IAUTO
500	3	0	0	0	0	1	0	0

[illegible]

## HYDROGRAPH ROUTING

CHANNEL ROUTE THRU SUB AREA-8

ISTAT	ICOMP	IECON	ITAFE	JPLT	JPRT	INAME	ISTAGE	IAUTO
8	1	0	0	0	0	1	0	0

ALL PLANS HAVE SAME

## ROUTING DATA

QLOSS	CLOSS	AVG	IMES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

### INCRMAL DEPTH CHANNEL ROUTING

GN(1)	GN(2)	GN(3)	ELNVT	ELMAX	RLNTH	SEL
0.0000	0.0466	0.0860	918.0	950.0	30200.	0.00070

## CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

100.00	950.00	760.00	930.00	1100.00	920.00	918.00	1175.00	918.00
1200.00	920.00	2100.00	940.00	3000.00	950.00			

STORAGE	0.00	82.96	254.04	590.20	1093.52	1763.99	2601.63	3606.42	4770.84
	7562.47	9149.52	10804.07	12806.11	14894.52	17218.75	19778.97	22575.18	25607.37

OUTFLOW	0.00	140.29	600.54	1489.81	2915.18	4977.50	7765.48	11378.04	15947.81
	28007.03	35607.34	44333.75	54243.99	64450.93	76192.83	89607.16	104771.55	121769.77

STAGE	918.00	919.68	921.37	923.05	924.74	926.42	928.11	929.79	931.47
	934.84	936.52	938.21	939.89	941.58	943.26	944.95	946.63	948.32

FLOW	0.00	140.29	600.54	1489.81	2915.18	4977.50	7765.48	11378.04	15947.81
	28007.03	35607.34	44333.75	54243.99	64450.93	76192.83	89607.16	104771.55	121769.77

MAXIMUM STAGE IS 934.1

MAXIMUM STAGE IS 939.6

MAXIMUM STAGE IS 934.1

MAXIMUM STAGE IS 939.6  
 MAXIMUM STAGE IS 934.1  
 MAXIMUM STAGE IS 939.0  
 MAXIMUM STAGE IS 934.1  
 MAXIMUM STAGE IS 939.6

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SUB-AREA RUNOFF COMPUTATION

SUB AREA-8 RUNOFF

ISTAQ 8 IECMP 0 IECON 0 IIAPE 0 JPLI 0 JPRI 0 INAME 1 ISTAGE 0 IAUO 0

HYDROGRAPH DATA

INVDG	IUHG	TAREA	SWAF	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	10.97	0.00	104.10	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.00	80.00	94.00	106.00	110.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.868

LOSS DATA

LROPT	SIRKR	DLTKR	RTIOL	ERAIN	SIRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
C	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.10	0.00	0.00

UNIT HYDROGRAPH DATA

TF= 6.21 CPE=C.77 NTA= 0

RECESSION DATA

STRTO= 22.00 QRCSN= 22.00 RTIOR= 1.00

UNIT HYDROGRAPH 22 END-OF-PERIOD ORDINATES, LAG= 6.18 HOURS, CP= 0.76 VOL= 1.00  
 58. 207. 395. 591. 761. 862. 880. 816. 488.  
 35%. 264. 194. 143. 105. 77. 57. 42. 23.  
 17. 12.

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	FO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
SUM 20.05 16.83 3.21 120524. ( 509. ) ( 428. ) ( 82. ) ( 3412.86 )													

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## COMBINE HYDROGRAPHS

## COMBINE 2 HYDROGRAPHS AT 600

ISTAQ	ICOPP	IECON	ITAFE	JPLI	JFRT	INAME	ISTAGE	IAUTO
600	2	0	0	0	0	1	0	0

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## HYDROGRAPH ROUTING

## CHANNEL ROUTE THRU SLB AREA-9

ISTAQ	ICOPP	IECON	ITAFE	JPLI	JFRT	INAME	ISTAGE	IAUTO
9	1	0	0	0	0	1	0	0

ALL PLANS HAVE SAME

## ROUTING DATA

QLOSS	CLQSS	AVG	IRCS	ISAME	IOFT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDCL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-1.	0

## NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
0.0800	0.0400	0.0800	911.0	950.0	20500.	0.00040

## CROSS SECTION COORDINATES--STA-ELEV, STA-ELEV--ETC

100.00	950.00	700.00	930.00	1200.00	920.00	1210.00	919.00	1250.00	919.00
1400.00	920.00	1600.00	940.00	3200.00	930.00				

STORAGE	0.00	0.00	0.00	0.00	0.00	5.63	197.88	523.77	568.63	1532.45
	3093.73	4359.65	6022.13	8081.16	10536.76	10536.76	13260.87	16047.24	18893.08	21798.41
OUTFLOW	0.00	0.00	0.00	0.00	0.00	2.65	433.34	1621.15	3547.03	6261.90
	14171.87	20121.23	27354.68	37662.46	49824.82	49824.82	65863.80	84588.95	105697.48	129114.52
STAGE	911.00	913.05	915.11	917.16	919.21	919.21	921.26	923.32	925.37	927.42
	931.53	933.58	935.63	937.68	939.74	939.74	941.79	943.84	945.89	947.95
FLOW	0.00	0.00	0.00	0.00	0.00	2.65	433.34	1621.15	3547.03	6261.90
	14171.87	20121.23	27354.68	37662.46	49824.82	49824.82	65863.80	84588.95	105697.48	129114.52

MAXIMUM STAGE IS 935.1

MAXIMUM STAGE IS 935.1

CREATON JUNE 19 1964  
 MAXIMUM STAGE IS 935.1  
 MAXIMUM STAGE IS 940.4  
 MAXIMUM STAGE IS 935.1  
 MAXIMUM STAGE IS 940.4  
 MAXIMUM STAGE IS 935.1  
 MAXIMUM STAGE IS 940.4

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SUB-AREA RUNOFF COMPLETION

SUB AREA-9 RUNOFF

ISTAQ 9 ICOMP 0 IECON 0 ITAPE 0 JPLT 0 JPRT 0 INAME 1 ISTAGE 0 IAUTO 0

IHYDG 1 IUNG 1 TAREA 7.64 TRSDA 0.00 TRSPC 104.10 RATIO 0.00C ISNOW 0 ISAME 1 LOCAL 0

HYDROGRAPH DATA

SPEE PMS R6 R12 R24 R48 R72 R96  
 C.00 21.00 80.00 94.00 106.00 110.00 C.00 C.00

TRSPC COMPUTED BY THE PROGRAM IS 0.868

LOSS DATA

LROPT STKR DLTKR RTIOL ERAIN SIKRS RTIOK STRTL CNSTL ALSPX RTIIP  
 C.00 C.00 1.00 C.00 C.00 1.00 1.00 C.1C C.00 0.00

UNIT HYDROGRAPH DATA

TF= 6.88 CP=0.77 NTA= 0

RECESSION DATA

STRTQ= 15.00 QRCSN= 15.00 RTIOR= 1.00

UNIT HYDROGRAPH 26 END-OF-PERIOD ORIGINATES, LAG= 6.85 HOURS, CP= 0.76 VOL= 1.00

32. 116. 224. 340. 448. 524. 554. 542. 474. 376.  
 292. 226. 175. 136. 106. 82. 63. 49. 38. 30.  
 23. 14. 11. 8. 6.

END-OF-PERIOD FLOW

MO.DA HR.MN PERIOD RAIN EXCS LCSS COMP Q PO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q  
 SUP 20.05 16.83 3.21 83934.  
 ( 509.3)( 428.3)( 82.3)( 2376.74)

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SUB-AREA RUNOFF COMPUTATION

SUB AREA-10 RUNOFF

ISTAQ 10 ICOPP C IECON 0 ITAFE C JPLT 0 JPRT 0 INAME 1 ISTAGE 0 IAUTO 0

HYDROGRAPH DATA

IHYDG 1 IUMG 1 TAREA 9.01 SNAP 0.00 TRSDA 104.10 TRSPC 0.00 RATIO C-0000 ISNOW 0 ISAME 1 LOCAL 0

PRECIP DATA

SPFE 0.00 PMS 21.00 R6 80.00 R12 94.00 R24 106.00 R48 110.00 R72 110.00 R96 110.00

TRSPC COMPUTED BY THE PROGRAM IS 0.868

LOSS DATA

LROPT 0 STRR 6.00 OLTKR 0.00 RTIOL 1.00 ERAIN 0.00 STRKS 0.00 RTIOK 1.00 STRIL 1.00 CNSTL 0.10 ALSMX 0.00 RTIMP 0.00

UNIT HYDROGRAPH DATA

TP= 6.60 CP=0.77 NTA= 0

RECESSION DATA

STRIQ= 16.00 QRCSN= 16.00 RTIOR= 1.00

UNIT HYDROGRAPH 25 END-OF-PERIOD ORDINATES, LAG= 6.62 HOURS, CP= 0.77 VOL= 1.00  
41. 147. 285. 429. 561. 650. 680. 654. 558. 431.  
328. 250. 190. 145. 110. 84. 64. 49. 37. 28.  
21. 16. 12. 9. 7.

END-OF-PERIOD FLOW

MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q  
SUM 20.05 16.83 3.21 99066.  
( 509.)( 428.)( 82.)( 2805.23)

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COMBINE HYDROGRAPHS

COMBINE 3 HYDROGRAPHS AT 700

ISTAQ 700 ICOPP 3 IECON 0 ITAFE 0 JPLT 0 JPRT 0 INAME 1 ISTAGE 0 IAUTO 0



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# HYDROGRAPH ROUTING

CHANNEL ROUTE THRU SLB AREA-11

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
11	1	0	0	0	0	1	0	0

ALL PLANS HAVE SAME

## ROUTING DATA

QLOSS	CLOSS	AVG	IRCS	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTOL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-1.	0

## NORMAL DEPTH CHANNEL ROUTING

QW(1)	QW(2)	QW(3)	ELNVT	ELMAX	RLNTH	SEL
0.0800	0.0400	0.0800	896.0	910.0	11600.	0.00200

CROSS SECTION COORDINATES--STA-ELEV, STA-ELEV--ETC

STA	ELEV	STA	ELEV
100.00	910.00	500.00	900.00
600.00	898.00	1000.00	900.00

STORAGE	OUTFLOW	STAGE	FLOW	MAXIMUM STAGE IS	MAXIMUM STAGE IS	MAXIMUM STAGE IS	MAXIMUM STAGE IS	MAXIMUM STAGE IS	MAXIMUM STAGE IS
0.00	0.00	896.00	0.00	908.2	914.8	908.0	914.8	908.8	914.8
739.70	8755.54	903.37	8755.54	908.2	914.8	908.0	914.8	908.8	914.8
18.38	91.34	896.74	91.34	908.2	914.8	908.0	914.8	908.8	914.8
874.46	10871.54	904.10	10871.54	908.2	914.8	908.0	914.8	908.8	914.8
60.57	595.09	898.21	595.09	908.2	914.8	908.0	914.8	908.8	914.8
1165.68	15806.65	905.58	15806.65	908.2	914.8	908.0	914.8	908.8	914.8
104.31	1040.30	898.95	1040.30	908.2	914.8	908.0	914.8	908.8	914.8
1322.13	18632.43	906.32	18632.43	908.2	914.8	908.0	914.8	908.8	914.8
1465.81	21702.20	907.05	21702.20	908.2	914.8	908.0	914.8	908.8	914.8
176.23	1681.90	899.68	1681.90	908.2	914.8	908.0	914.8	908.8	914.8
272.92	2600.59	900.42	2600.59	908.2	914.8	908.0	914.8	908.8	914.8
1656.72	25020.12	907.79	25020.12	908.2	914.8	908.0	914.8	908.8	914.8
378.77	3750.64	901.16	3750.64	908.2	914.8	908.0	914.8	908.8	914.8
1836.86	28590.57	908.53	28590.57	908.2	914.8	908.0	914.8	908.8	914.8
491.85	5215.33	901.89	5215.33	908.2	914.8	908.0	914.8	908.8	914.8
2020.22	32418.07	909.26	32418.07	908.2	914.8	908.0	914.8	908.8	914.8
3790.64	3790.64	901.16	3790.64	908.2	914.8	908.0	914.8	908.8	914.8
28590.57	28590.57	908.53	28590.57	908.2	914.8	908.0	914.8	908.8	914.8
5215.33	5215.33	901.89	5215.33	908.2	914.8	908.0	914.8	908.8	914.8
32418.07	32418.07	909.26	32418.07	908.2	914.8	908.0	914.8	908.8	914.8



MAXIMUM STAGE IS 914.8

[illegible]

## SUB-AREA RUNOFF COMPUTATION

SUB AREA-11 RUNOFF

ISTAQ	ICCP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
11	0	0	0	0	0	1	0	0

## HYDROGRAPH DATA

INHD6	IUFG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	7.57	0.00	104.10	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.00	80.00	94.00	106.00	110.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.868

LOSS DATA

LPROPT	STKRK	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	0.10	0.00	0.00	0.00

UNIT HYDROGRAPH DATA

TF= 5.99 CP=0.77 NTA= 0

TF= 5.99 CP=0.77 NTA= 0

RECESSION DATA

STRITQ= 15.00 QRCN= 15.00 RTIOR= 1.00

	UNIT HYDROGRAPH	22 END-OF-PERIOD ORIGINATES,	LAGE =	5.93 HOURS,	CP = 0.76	VOL = 1.00
45.	159.	365.	455.	630.	532.	300.
		122.	90.	67.	405.	405.
				49.	27.	20.
11.	8.			37.	15.	

END-OF-PERIOD FLOW

	MO-DA	HR-MN	PERIOD	RAIN	EXCS	LOSS	COMP G	P.O.DA	HR-MN	PERIOD	RAIN	EXCS	LOSS	COMP G
SUM					20.05	20.05	98771.						0.00	
( 509.)					( 509.)	( 0.)	( 2796.86)							

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## SUB-AREA RUNOFF COMPUTATION

SUE AREA-12 RUNOFF

ICCSQ	ICCP	IECON	ITAGE	JPLT	JFRT	INAME	ISTAGE	IAUTD
12	0	0	0	0	1	0	0	0

INYDG 1  
 TAREA 8.19  
 IUNG 1  
 SNAP 0.00  
 TRSDA 104.10  
 TRSPC 0.00  
 RATIO 0.00  
 ISNOW 0  
 ISAME 1  
 LOCAL 0

HYDROGRAPH DATA  
 PRECIP DATA  
 R6 80.00  
 R12 94.00  
 R24 106.00  
 R48 110.00  
 R72 0.00  
 R96 0.00

TRSPC COMPUTED BY THE PROGRAM IS 1.868

LOSS DATA  
 LROPT 0  
 STRKR 0.00  
 DLTKR 0.00  
 RTIOL 1.00  
 ERAIN 0.00  
 STRKS 0.00  
 RTIOL 1.00  
 SIRTIL 1.00  
 CNSTL 0.10  
 ALSMX 0.00  
 RTIPE 0.00

UNIT HYDROGRAPH DATA  
 TF= 6.47 CP=0.77 NTA= C

RECESSION DATA

STRIQ= 16.00  
 GRCSN= 16.00  
 RTIOR= 1.00  
 APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TF ARE TC= 8.24 AND R= 3.56 INTERVALS

UNIT HYDROGRAPH 24 END-OF-PERIOD ORDINATES, LAG= 6.46 HOURS, CP= 0.76 VOL= 1.00  
 39. 139. 268. 403. 526. 605. 629. 600. 506. 386.  
 291. 219. 165. 124. 94. 71. 53. 40. 30. 23.  
 17. 13. 10.

MO. DA	HR. MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	PO. DA	HR. MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	1.00	1	0.01	0.00	0.01	16.	1.02	22.00	46	0.22	0.12	0.10	8439.
1.01	2.00	2	0.01	0.00	0.01	16.	1.02	23.00	47	0.22	0.12	0.10	7907.
1.01	3.00	3	0.01	0.00	0.01	16.	1.03	0.00	48	0.22	0.12	0.10	6883.
1.01	4.00	4	0.01	0.00	0.01	16.	1.03	1.00	49	0.00	0.00	0.00	5638.
1.01	5.00	5	0.01	0.00	0.01	16.	1.03	2.00	50	0.00	0.00	0.00	4472.
1.01	6.00	6	0.01	0.00	0.01	16.	1.03	3.00	51	0.00	0.00	0.00	3497.
1.01	7.00	7	0.02	0.00	0.02	16.	1.03	4.00	52	0.00	0.00	0.00	2732.
1.01	8.00	8	0.02	0.00	0.02	16.	1.03	5.00	53	0.00	0.00	0.00	2129.
1.01	9.00	9	0.02	0.00	0.02	16.	1.03	6.00	54	0.00	0.00	0.00	1650.
1.01	10.00	10	0.02	0.00	0.02	16.	1.03	7.00	55	0.00	0.00	0.00	1268.
1.01	11.00	11	0.02	0.00	0.02	16.	1.03	8.00	56	0.00	0.00	0.00	964.
1.01	12.00	12	0.02	0.00	0.02	16.	1.03	9.00	57	0.00	0.00	0.00	729.
1.01	13.00	13	0.06	0.00	0.06	16.	1.03	10.00	58	0.00	0.00	0.00	551.
1.01	14.00	14	0.07	0.00	0.07	16.	1.03	11.00	59	0.00	0.00	0.00	418.
1.01	15.00	15	0.08	0.00	0.08	16.	1.03	12.00	60	0.00	0.00	0.00	317.
1.01	16.00	16	0.21	0.00	0.21	16.	1.03	13.00	61	0.00	0.00	0.00	235.
1.01	17.00	17	0.08	0.00	0.08	16.	1.03	14.00	62	0.00	0.00	0.00	172.
1.01	18.00	18	0.06	0.00	0.06	16.	1.03	15.00	63	0.00	0.00	0.00	122.
1.01	19.00	19	0.01	0.00	0.01	16.	1.03	16.00	64	0.00	0.00	0.00	66.
1.01	20.00	20	0.01	0.00	0.01	16.	1.03	17.00	65	0.00	0.00	0.00	43.
1.01	21.00	21	0.01	0.00	0.01	16.	1.03	18.00	66	0.00	0.00	0.00	28.
1.01	22.00	22	0.01	0.00	0.01	16.	1.03	19.00	67	0.00	0.00	0.00	24.
1.01	23.00	23	0.01	0.00	0.01	16.	1.03	20.00	68	0.00	0.00	0.00	22.





[illegible]

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1200

LSTR  
C

SPRAT  
D



### NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
0.0800	0.0400	0.0800	860.C	880.C	4500.	0.00100

## CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

100.00	880.00	870.00	265.00	860.00	475.00	860.00
500.00	864.00	600.00	878.00	700.00	880.00	

	0.00	23.41	47.96	73.66	100.52	129.21	160.06	193.05	228.21
STORAGE	304.91	346.11	389.03	433.69	480.08	528.20	578.06	629.65	684.95
OUTFLOW	C.00	271.60	869.68	1724.96	2827.70	4221.03	5846.80	7701.75	9783.91
	14631.30	17398.63	20388.36	23599.96	27033.45	30689.11	34567.52	38669.46	42712.23
STAGE	800.00	861.03	862.11	863.16	864.21	865.26	866.32	867.37	868.42
	870.53	871.58	872.63	873.68	874.74	875.79	876.84	877.89	878.95
FLOW	0.00	271.60	869.68	1724.96	2827.70	4221.03	5846.80	7701.75	9783.91
	14631.30	17398.63	20388.36	23599.96	27033.45	30689.11	34567.52	38669.46	42712.23

MAXIMUM STAGE IS	876.8
MAXIMUM STAGE IS	885.8
MAXIMUM STAGE IS	876.8
MAXIMUM STAGE IS	885.8
MAXIMUM STAGE IS	876.8
MAXIMUM STAGE IS	885.8
MAXIMUM STAGE IS	876.8
MAXIMUM STAGE IS	885.8

## SUB-AREA RUNOFF COMPUTATION

SUB AREA-13 RUNOFF											
INHYDC	1	IUF6	TAREA	SNAP	IRSDA	TRSDA	IRATC	ISNCH	ISAME	ISTAGE	IAUTO
		1	0.54	0.00	104.10	0.00	0.000	0	1	0	0
HYDROGRAPH DATA											
				IECON	ITAPE	JPLT	JPRT	INAME			
				0	0	0	0				
				ICOMP	ISTAG						
				0	13						

PRECIP DATA  
 R6 R12 R24 R48 R72 R96  
 0.00 21.00 40.00 106.00 110.00 0.00 0.00

TRSF COMPUTED BY THE PROGRAM IS 0.868

LOSS DATA  
 LROPT STRKR DLTKR RTIOL ERAIN STRKS RTIOL CNSTL ALSMX RTIOP  
 0 0.00 0.00 1.00 0.00 0.00 1.00 0.10 0.00

UNIT HYDROGRAPH DATA  
 TF= 3.11 CP=0.77 NTA= 0

RECESSION DATA  
 STRTQ= 2.00 QRCSN= 2.00 RTIOR= 1.00

UNIT HYDROGRAPH 11 END-OF-PERIOD ORIGINATES, LAG= 3.09 HOURS, CP= 0.77 VOL= 1.00  
 21. 70. 117. 130. 97. 53. 27. 13. 7. 3.

END-OF-PERIOD FLOW  
 MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q  
 SUM 20.05 16.83 3.21 9269.  
 ( 509.)( 428.)( 82.)( 262.47)

COMBINE HYDROGRAPHS

COMBINE 2 HYDROGRAPHS AT 900  
 ISTAQ ICOMP 2 IECON ITAPE JPLT JPRT INAME ISTAGE IAUTO  
 900 0 0 0 0 0 0 0 0

HYDROGRAPH ROUTING

ROUTE OVER NATKA CREEK DAM  
 ISTAQ ICOMP 1 IECON ITAPE JPLT JPRT INAME ISTAGE IAUTO  
 900 0 0 0 0 0 0 0 0

ROUTING DATA

ALL PLANS HAVE SAME  
 ROUTING DATA  
 QLOSS CLOSS AVG IRES ISAME ICFT IFMP LSTR  
 0.00 0.000 0.00 1 1 0 0 C  
 NSTPS NSTDL LAG AMSK X ISK STORA ISPRAT  
 1 0 0 0 0 0 0 0 0 0

CAPACITY= 0. 230. 310. 390. 470. 550. 630. 710. 780. 860.

ELEVATION= 858. 864. 866. 868. 870. 872. 874. 876. 878. 880.

CREL SPWID COGW EXPW ELEV COQL CAREA EXPL  
864.0 160.0 3.2 1.5 0.0 0.0 0.0 0.0

DAM DATA  
TOPEL COGD EXPD DAMWID  
866.0 2.6 1.5 20.

BRWID Z  
40. 1.00 858.00 1.00 866.00 879.70

PEAK OUTFLOW IS 34525. AT TIME 49.00 HOURS

BEGIN DAM FAILURE AT 43.00 HOURS

PEAK OUTFLOW IS 71507. AT TIME 49.00 HOURS

BRWID Z  
80. 1.00 858.00 1.00 866.00 879.70

PEAK OUTFLOW IS 34525. AT TIME 49.00 HOURS

BEGIN DAM FAILURE AT 43.00 HOURS

PEAK OUTFLOW IS 71500. AT TIME 49.00 HOURS

BRWID Z  
120. 1.00 858.00 1.00 866.00 879.70

PEAK OUTFLOW IS 34525. AT TIME 49.00 HOURS

BEGIN DAM FAILURE AT 43.00 HOURS

PEAK OUTFLOW IS 71500. AT TIME 49.00 HOURS

BRWID Z  
160. 1.00 858.00 1.00 866.00 879.70

PEAK OUTFLOW IS 34525. AT TIME 49.00 HOURS

BEGIN DAM FAILURE AT 43.00 HOURS

PEAK OUTFLOW IS 71500. AT TIME 49.00 HOURS

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PEAK OUTFLOW IS 71582. AT TIME 49.00 HOURS

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HYDROGRAPH ROUTING

CHANNEL ROUTE THRU SUB AREA-14

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JFRT	INAME	ISTAGE	IAUTO
14	1	0	0	0	0	1	0	0

ALL PLANS HAVE SAME

ROUTING DATA

QLCSS	CLOSS	AVG	IRIS	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0
NSTES	NSTD	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-1.	0

NORMAL DEPTH CHANNEL ROUTING

Q1(1)	Q1(2)	Q1(3)	ELNVT	ELMAX	RLNTH	SEL
0.0800	0.0400	0.0800	835.0	860.0	2100.	0.00700

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

100.00	860.00	250.00	850.00	300.00	840.00	310.00	835.00	350.00	835.00
360.00	840.00	425.00	850.00	500.00	860.00				

STORAGE	0.00	2.70	5.74	9.11	12.83	17.31	22.75	29.14	36.50
	54.09	64.32	75.68	88.85	103.89	120.81	139.60	160.28	182.83

OUTFLOW	0.00	159.85	646.89	1300.32	2177.31	3377.34	4830.92	6554.40	8562.52
	13484.67	16433.90	19613.51	23159.36	27173.36	31678.53	36703.05	42276.19	48427.26

STAGE	635.00	836.32	837.63	838.95	840.26	841.58	842.89	844.21	845.53
	846.16	849.47	850.79	852.10	853.42	854.74	856.05	857.37	858.68

FLOW	0.00	159.85	646.89	1300.32	2177.31	3377.34	4830.92	6554.40	8562.52
	13484.67	16433.90	19613.51	23159.36	27173.36	31678.53	36703.05	42276.19	48427.26

MAXIMUM STAGE IS 855.5

MAXIMUM STAGE IS 863.2

MAXIMUM STAGE IS 855.5

MAXIMUM STAGE IS 863.2



MAXIMUM STAGE IS 855.5  
 MAXIMUM STAGE IS 863.2  
 MAXIMUM STAGE IS 855.5  
 MAXIMUM STAGE IS 863.2

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SUB-AREA RUNOFF COMPUTATION

SUB AREA-14 RUNOFF  
 ISTAQ 14  
 ICOMP 0  
 IECON 0  
 ITAFE 0  
 JPLI 0  
 JPRT 0  
 INAME 1  
 ISTAGE 0  
 IAUTO 0

HYDROGRAPH DATA  
 IHYDG 1  
 IUPG 1  
 TAREA 0.37  
 SNAF 0.00  
 TRSDA 104.10  
 TRSPC 0.00  
 RATIO 0.000  
 ISNOW 0  
 ISAME 1  
 LOCAL 0

PRECIP DATA  
 R6 80.00  
 R12 94.00  
 R24 106.00  
 R48 110.00  
 R72 110.00  
 R96 110.00

TRSPC COMPUTED BY THE PROGRAM IS 0.668

LOSS DATA  
 LROPT 0  
 STRK 0.00  
 DLTKR 0.00  
 RTIOL 1.00  
 ERAIN 0.00  
 STRKS 0.00  
 RTIOK 1.00  
 STRTL 1.00  
 CNSTL 0.10  
 ALSMX 0.00  
 RTIMP 0.00

UNIT HYDROGRAPH DATA  
 TF= 2.88  
 CP=0.77  
 NIA= 0

RECESION DATA  
 STRTG= 1.00  
 GRCSN= 1.00  
 RTIOR= 1.00  
 UNIT HYDROGRAPH 9  
 END-OF-PERIOD ORDINATES, LAG= 2.87 HOURS, CP= 0.76  
 VOL= 1.00  
 12. 39. 61. 80. 38. 16. 7. 3. 1.

MO-DA HR-MN PERIOD RAIN EXCS LOSS EXCS LOSS COMP Q  
 SUM 20.05 16.83 3.21 4095.  
 ( 509. ) ( 428. ) ( 82. ) ( 115.96 )

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COMBINE HYDROGRAPHS

COMBINE 2-HYDROGRAPHS AT 1.000

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ISTAQ ICCPP IECON ITAPE JPLT JPRT INAME ISTAGE I AUTO  
1000 2 0 0 0 0 1 0 0

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PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS  
 FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)  
 AREA IN SQUARE MILES (SQUARE KILOMETERS)

RATIOS APPLIED TO FLOWS

OPERATION	STATION	AREA	PLAN	RATIO	1	RATIO	2
				0.50		1.00	
HYDROGRAPH AT	1	8.78	1	5682.	10164.		
	(	22.74)	(	143.91)	( 287.82)	(	
	2		2	5082.	10164.		
	(		(	143.91)	( 287.82)	(	
	3		3	5082.	10164.		
	(		(	143.91)	( 287.82)	(	
	4		4	5682.	10164.		
	(		(	143.91)	( 287.82)	(	
HYDROGRAPH AT	1	4.94	1	3149.	6297.		
	(	12.79)	(	89.16)	( 178.32)	(	
	2		2	3149.	6297.		
	(		(	89.16)	( 178.32)	(	
	3		3	3149.	6297.		
	(		(	89.16)	( 178.32)	(	
	4		4	3149.	6297.		
	(		(	89.16)	( 178.32)	(	
2 COMBINED	100	13.72	1	8127.	16254.		
	(	35.53)	(	230.13)	( 460.26)	(	
	2		2	8127.	16254.		
	(		(	230.13)	( 460.26)	(	
	3		3	8127.	16254.		
	(		(	230.13)	( 460.26)	(	
	4		4	8127.	16254.		
	(		(	230.13)	( 460.26)	(	
ROUTED TO	5	13.72	1	8135.	16263.		
	(	35.53)	(	230.36)	( 461.07)	(	
	2		2	8135.	16263.		
	(		(	230.36)	( 461.07)	(	
	3		3	8135.	16263.		
	(		(	230.36)	( 461.07)	(	
	4		4	8135.	16263.		
	(		(	230.36)	( 461.07)	(	
HYDROGRAPH AT	5	5.05	1	3500.	7001.		
	(	15.15)	(	99.12)	( 198.24)	(	
	2		2	3500.	7001.		
	(		(	99.12)	( 198.24)	(	

## 2 COMBINED

200 ( 19.57  
( 50.69)

3 3500. 7001.  
( 99.12) ( 198.24) ( )  
4 3500. 7001.  
( 99.12) ( 198.24) ( )  
1 11635. 23283.  
( 329.48) ( 659.31) ( )  
2 11635. 23283.  
( 329.48) ( 659.31) ( )  
3 11635. 23283.  
( 329.48) ( 659.31) ( )  
4 11635. 23283.  
( 329.48) ( 659.31) ( )

## ROUTED TO

4 ( 19.57  
( 50.69)

1 11456. 23084.  
( 324.41) ( 653.66) ( )  
2 11456. 23084.  
( 324.41) ( 653.66) ( )  
3 11456. 23084.  
( 324.41) ( 653.66) ( )  
4 11456. 23084.  
( 324.41) ( 653.66) ( )

## HYDROGRAPH AT

4 ( 19.66  
( 50.92)

1 5599. 19198.  
( 271.81) ( 543.62) ( )  
2 5599. 19198.  
( 271.81) ( 543.62) ( )  
3 5599. 19198.  
( 271.81) ( 543.62) ( )  
4 5599. 19198.  
( 271.81) ( 543.62) ( )

## 2 COMBINED

300 ( 39.23  
( 101.60)

1 20835. 41730.  
( 589.98) ( 1181.66) ( )  
2 20835. 41730.  
( 589.98) ( 1181.66) ( )  
3 20835. 41730.  
( 589.98) ( 1181.66) ( )  
4 20835. 41730.  
( 589.98) ( 1181.66) ( )

## ROUTED TO

5 ( 39.23  
( 101.60)

1 16759. 34130.  
( 474.56) ( 966.46) ( )  
2 16759. 34130.  
( 474.56) ( 966.46) ( )  
3 16759. 34130.  
( 474.56) ( 966.46) ( )  
4 16759. 34130.  
( 474.56) ( 966.46) ( )

## HYDROGRAPH AT

5 ( 39.23  
( 101.60)

1 16759. 34130.



( 57.50)

COMBINED 400 61.43  
( 159.10)

ROUTED TO 6 61.43  
( 159.10)

HYDROGRAPH AT 6 21.53  
( 55.76)

HYDROGRAPH AT 7 12.58  
( 32.58)

COMBINED 500 95.54  
( 247.45)

1 374.38( 748.75)(  
2 13221. 26442.  
( 374.38)( 748.75)(  
3 13221. 26442.  
( 374.38)( 748.75)(  
4 13221. 26442.  
( 374.38)( 748.75)(

1 26971. 55037.  
( 763.74)( 1558.46)(  
2 26971. 55037.  
( 763.74)( 1558.46)(  
3 26971. 55037.  
( 763.74)( 1558.46)(  
4 26971. 55037.  
( 763.74)( 1558.46)(

1 15267. 33229.  
( 432.33)( 940.94)(  
2 15267. 33229.  
( 432.33)( 940.94)(  
3 15267. 33229.  
( 432.33)( 940.94)(  
4 15267. 33229.  
( 432.33)( 940.94)(

1 10769. 21537.  
( 304.93)( 609.87)(  
2 10769. 21537.  
( 304.93)( 609.87)(  
3 10769. 21537.  
( 304.93)( 609.87)(  
4 10769. 21537.  
( 304.93)( 609.87)(

1 6225. 12451.  
( 176.28)( 352.57)(  
2 6225. 12451.  
( 176.28)( 352.57)(  
3 6225. 12451.  
( 176.28)( 352.57)(  
4 6225. 12451.  
( 176.28)( 352.57)(

1 28718. 57755.  
( 813.20)( 1635.45)(  
2 28718. 57755.  
( 813.20)( 1635.45)(  
3 28718. 57755.  
( 813.20)( 1635.45)(  
4 28718. 57755.  
( 813.20)( 1635.45)(

ROUTED TO

8 95.54  
( 247.45)

4 813.20 ( 1635.45) ( 247.45)  
1 24988. 52774.  
( 707.58) ( 1494.38) ( 247.45)  
2 24988. 52774.  
( 707.58) ( 1494.38) ( 247.45)  
3 24988. 52774.  
( 707.58) ( 1494.38) ( 247.45)  
4 24988. 52774.  
( 707.58) ( 1494.38) ( 247.45)

HYDROGRAPH AT

8 10.97  
( 28.41)

1 5876. 11751.  
( 166.38) ( 332.75) ( 11751.)  
2 5876. 11751.  
( 166.38) ( 332.75) ( 11751.)  
3 5876. 11751.  
( 166.38) ( 332.75) ( 11751.)  
4 5876. 11751.  
( 166.38) ( 332.75) ( 11751.)

2 COMBINED

600 106.51  
( 275.86)

1 28279. 59304.  
( 800.77) ( 1679.30) ( 59304.)  
2 28279. 59304.  
( 800.77) ( 1679.30) ( 59304.)  
3 28279. 59304.  
( 800.77) ( 1679.30) ( 59304.)  
4 28279. 59304.  
( 800.77) ( 1679.30) ( 59304.)

ROUTED TO

9 106.51  
( 275.86)

1 25973. 55140.  
( 735.46) ( 1561.40) ( 55140.)  
2 25973. 55140.  
( 735.46) ( 1561.40) ( 55140.)  
3 25973. 55140.  
( 735.46) ( 1561.40) ( 55140.)  
4 25973. 55140.  
( 735.46) ( 1561.40) ( 55140.)

HYDROGRAPH AT

9 7.64  
( 19.79)

1 3784. 7568.  
( 107.15) ( 214.30) ( 7568.)  
2 3784. 7568.  
( 107.15) ( 214.30) ( 7568.)  
3 3784. 7568.  
( 107.15) ( 214.30) ( 7568.)  
4 3784. 7568.  
( 107.15) ( 214.30) ( 7568.)

HYDROGRAPH AT

10 9.01  
( 23.34)

1 4584. 9169.  
( 129.81) ( 259.63) ( 9169.)  
2 4584. 9169.  
( 129.81) ( 259.63) ( 9169.)

3 4584. 9169.  
( 125.81)( 259.63)(  
4 4584. 9169.  
( 125.81)( 259.63)(

5 COMBINED 700 123.16  
( 318.98)

1 29907. 63169.  
( 846.88)( 1788.73)(  
2 29907. 63169.  
( 846.88)( 1788.73)(  
3 29907. 63169.  
( 846.88)( 1788.73)(  
4 29907. 63169.  
( 846.88)( 1788.73)(

ROUTED TO 11 123.16  
( 318.98)

1 29763. 62886.  
( 842.78)( 1780.72)(  
2 29763. 62886.  
( 842.78)( 1780.72)(  
3 29763. 62886.  
( 842.78)( 1780.72)(  
4 29763. 62886.  
( 842.78)( 1780.72)(

HYDROGRAPH AT 11 7.57  
( 19.61)

1 4417. 8834.  
( 125.07)( 250.14)(  
2 4417. 8834.  
( 125.07)( 250.14)(  
3 4417. 8834.  
( 125.07)( 250.14)(  
4 4417. 8834.  
( 125.07)( 250.14)(

HYDROGRAPH AT 12 8.19  
( 21.21)

1 4220. 8439.  
( 115.49)( 238.98)(  
2 4220. 8439.  
( 115.49)( 238.98)(  
3 4220. 8439.  
( 115.49)( 238.98)(  
4 4220. 8439.  
( 115.49)( 238.98)(

5 COMBINED 800 138.92  
( 359.80)

1 34441. 71503.  
( 975.27)( 2024.74)(  
2 34441. 71503.  
( 975.27)( 2024.74)(  
3 34441. 71503.  
( 975.27)( 2024.74)(  
4 34441. 71503.  
( 975.27)( 2024.74)(

PRINTED T 12 128 60

74470

ROUTED TO 13 ( 359.80)

( 975.91) ( 2024.07) ( 34464. 71479. ( 975.91) ( 2024.07) ( 34464. 71479. ( 975.91) ( 2024.07) ( 34464. 71479. ( 975.91) ( 2024.07) ( 34464. 71479.

HYDROGRAPH AT 13 0.84 ( 2.18)

1 688. 1377. ( 15.49) ( 38.99) ( 688. 1377. ( 15.49) ( 38.99) ( 688. 1377. ( 15.49) ( 38.99) ( 688. 1377. ( 15.49) ( 38.99)

2 COMBINED 980 139.76 ( 361.97)

1 34522. 71595. ( 977.55) ( 2027.34) ( 34522. 71595. ( 977.55) ( 2027.34) ( 34522. 71595. ( 977.55) ( 2027.34) ( 34522. 71595. ( 977.55) ( 2027.34)

ROUTED TO 980 139.76 ( 361.97)

1 34525. 71567. ( 977.63) ( 2026.55) ( 34525. 71568. ( 977.64) ( 2027.14) ( 34525. 71566. ( 977.64) ( 2026.53) ( 34525. 71582. ( 977.64) ( 2026.97)

ROUTED TO 14 139.76 ( 361.97)

1 34520. 71668. ( 977.51) ( 2029.40) ( 34521. 71692. ( 977.52) ( 2030.09) ( 34521. 71736. ( 977.52) ( 2031.33) ( 34521. 71756. ( 977.52) ( 2031.90)

HYDROGRAPH AT 14 0.37 ( 0.96)

1 321. 642. ( 5.08) ( 18.17) ( 321. 642. ( 5.08) ( 18.17) ( 321. 642. ( 5.08) ( 18.17) ( 321. 642. ( 5.08) ( 18.17)



2 COMBINED 1000 140-13  
( 362.53)

( 9.08)( 18.17)(  
1 34537. 71702.  
( 977.99)( 2030.36)(  
2 34538. 71726.  
( 978.00)( 2031.05)(  
3 34538. 71770.  
( 978.00)( 2032.29)(  
4 34538. 71790.  
( 978.00)( 2032.87)(

PLAN 1 STATION 3

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
C.50	8135.	1146.8	45.00
1.00	16283.	1149.0	45.00

PLAN 2 STATION 3

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
C.50	8135.	1146.8	45.00
1.00	16283.	1149.0	45.00

PLAN 3 STATION 3

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
C.50	8135.	1146.8	45.00
1.00	16283.	1149.0	45.00

PLAN 4 STATION 3

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
C.50	8135.	1146.8	45.00
1.00	16283.	1149.0	45.00

PLAN 1 STATION 4

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
C.50	11456.	1004.4	45.00
1.00	23084.	1006.8	45.00

PLAN 2 STATION 4

FORM 6-58

RATIO	MAXIMUM FLOW, CFS	MAXIMUM STAGE, FT	TIME HOURS
0.50	11456.	1004.4	45.00
1.00	23084.	1006.8	45.00

PLAN 3 STATION 4

RATIO	MAXIMUM FLOW, CFS	MAXIMUM STAGE, FT	TIME HOURS
0.50	11456.	1004.4	45.00
1.00	23084.	1006.8	45.00

PLAN 4 STATION 4

RATIO	MAXIMUM FLOW, CFS	MAXIMUM STAGE, FT	TIME HOURS
0.50	11456.	1004.4	45.00
1.00	23084.	1006.8	45.00

PLAN 1 STATION 5

RATIO	MAXIMUM FLOW, CFS	MAXIMUM STAGE, FT	TIME HOURS
0.50	16759.	960.4	48.00
1.00	34130.	964.0	48.00

PLAN 2 STATION 5

RATIO	MAXIMUM FLOW, CFS	MAXIMUM STAGE, FT	TIME HOURS
0.50	16759.	960.4	48.00
1.00	34130.	964.0	48.00

PLAN 3 STATION 5

RATIO	MAXIMUM FLOW, CFS	MAXIMUM STAGE, FT	TIME HOURS
0.50	16759.	960.4	48.00
1.00	34130.	964.0	48.00

PLAN 4 STATION 5

RATIO	MAXIMUM FLOW, CFS	MAXIMUM STAGE, FT	TIME HOURS
0.50	16759.	960.4	48.00
1.00	34130.	964.0	48.00

PLAN 1 STATION 6

RATIO	MAXIMUM FLOW, CFS	MAXIMUM STAGE, FT	TIME HOURS
0.50	15267.	949.8	52.00
1.00	33229.	953.7	51.00

PLAN 2 STATION 6

RATIO	MAXIMUM FLOW, CFS	MAXIMUM STAGE, FT	TIME HOURS
0.50	15267.	949.8	52.00
1.00	33229.	953.7	51.00

PLAN 3 STATION 6

RATIO	MAXIMUM FLOW, CFS	MAXIMUM STAGE, FT	TIME HOURS
0.50	15267.	949.8	52.00
1.00	33229.	953.7	51.00

PLAN 4 STATION 6

RATIO	MAXIMUM FLOW, CFS	MAXIMUM STAGE, FT	TIME HOURS
0.50	15267.	949.8	52.00
1.00	33229.	953.7	51.00

PLAN 1 STATION 8

RATIO	MAXIMUM FLOW, CFS	MAXIMUM STAGE, FT	TIME HOURS
0.50	24988.	934.1	50.00
1.00	52774.	939.6	50.00

PLAN 2 STATION 8

RATIO	MAXIMUM FLOW, CFS	MAXIMUM STAGE, FT	TIME HOURS
0.50	24988.	934.1	50.00
1.00	52774.	939.6	50.00

PLAN 3 STATION 8

RATIO	MAXIMUM FLOW, CFS	MAXIMUM STAGE, FT	TIME HOURS
0.50	24988.	934.1	50.00
1.00	52774.	939.6	50.00

PLAN	STATION	MAXIMUM FLOW, CFS	MAXIMUM STAGE, FT	TIME HOURS
PLAN 4	STATION 8	24988.	934.1	50.00
		52774.	939.6	50.00

RATIO	MAXIMUM FLOW, CFS	MAXIMUM STAGE, FT	TIME HOURS
C.50	24988.	934.1	50.00
1.00	52774.	939.6	50.00

PLAN	STATION	MAXIMUM FLOW, CFS	MAXIMUM STAGE, FT	TIME HOURS
PLAN 1	STATION 9	25973.	935.1	52.00
		55140.	940.4	51.00

RATIO	MAXIMUM FLOW, CFS	MAXIMUM STAGE, FT	TIME HOURS
C.50	25973.	935.1	52.00
1.00	55140.	940.4	51.00

PLAN	STATION	MAXIMUM FLOW, CFS	MAXIMUM STAGE, FT	TIME HOURS
PLAN 3	STATION 9	25973.	935.1	52.00
		55140.	940.4	51.00

RATIO	MAXIMUM FLOW, CFS	MAXIMUM STAGE, FT	TIME HOURS
C.50	25973.	935.1	52.00
1.00	55140.	940.4	51.00

PLAN	STATION	MAXIMUM FLOW, CFS	MAXIMUM STAGE, FT	TIME HOURS
PLAN 1	STATION 11	29763.	908.8	51.00
		62886.	914.8	51.00

PLAN	STATION	MAXIMUM FLOW, CFS	MAXIMUM STAGE, FT	TIME HOURS
PLAN 2	STATION 11	29763.	908.8	51.00
		62886.	914.8	51.00





# SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

ELEVATION  
STORAGE  
CUTFLOW

INITIAL VALUE  
866.00  
310.  
1448.

SPILLWAY CREST  
864.00  
230.  
C.

TOP OF DAM  
866.00  
310.  
1448.

RATIO  
OF  
PMF  
0.50  
1.00

MAXIMUM  
RESERVOIR  
W.S.ELEV  
879.70  
883.45

MAXIMUM  
DEPTH  
OVER DAM  
13.70  
17.45

MAXIMUM  
STORAGE  
AC-FT  
848.  
998.

MAXIMUM  
OUTFLOW  
CFS  
34525.  
71567.

DURATION  
OVER TOP  
HOURS  
55.00  
50.00

TIME OF  
MAX OUTFLOW  
HOURS  
45.00  
45.00

TIME OF  
FAILURE  
HOURS  
0.00  
43.00

PLAN 2 .....

ELEVATION  
STORAGE  
OUTFLOW

INITIAL VALUE  
866.00  
310.  
1448.

SPILLWAY CREST  
864.00  
230.  
C.

TOP OF DAM  
866.00  
310.  
1448.

RATIO  
OF  
PMF  
0.50  
1.00

MAXIMUM  
RESERVOIR  
W.S.ELEV  
879.70  
880.88

MAXIMUM  
DEPTH  
OVER DAM  
13.70  
14.88

MAXIMUM  
STORAGE  
AC-FT  
848.  
895.

MAXIMUM  
OUTFLOW  
CFS  
34525.  
71588.

DURATION  
OVER TOP  
HOURS  
55.00  
45.00

TIME OF  
MAX OUTFLOW  
HOURS  
45.00  
49.00

TIME OF  
FAILURE  
HOURS  
0.00  
43.00

PLAN 3 .....

ELEVATION  
STORAGE  
OUTFLOW

INITIAL VALUE  
866.00  
310.  
1448.

SPILLWAY CREST  
864.00  
230.  
C.

TOP OF DAM  
866.00  
310.  
1448.

RATIO  
OF  
PMF  
0.50  
1.00

MAXIMUM  
RESERVOIR  
W.S.ELEV  
879.70  
880.16

MAXIMUM  
DEPTH  
OVER DAM  
13.70  
14.16

MAXIMUM  
STORAGE  
AC-FT  
848.  
866.

MAXIMUM  
OUTFLOW  
CFS  
34525.  
71566.

DURATION  
OVER TOP  
HOURS  
55.00  
42.00

TIME OF  
MAX OUTFLOW  
HOURS  
45.00  
49.00

TIME OF  
FAILURE  
HOURS  
0.00  
43.00

PLAN 4 .....

ELEVATION  
STORAGE  
CUTFLOW

INITIAL VALUE  
866.00  
310.  
1448.

SPILLWAY CREST  
864.00  
230.  
C.

TOP OF DAM  
866.00  
310.  
1448.

RATIO  
OF  
PMF  
0.50  
1.00

MAXIMUM  
RESERVOIR  
W.S.ELEV  
879.70  
880.15

MAXIMUM  
DEPTH  
OVER DAM  
13.70  
14.15

MAXIMUM  
STORAGE  
AC-FT  
848.  
866.

MAXIMUM  
OUTFLOW  
CFS  
34525.  
71582.

DURATION  
OVER TOP  
HOURS  
55.00  
39.00

TIME OF  
MAX OUTFLOW  
HOURS  
45.00  
49.00

TIME OF  
FAILURE  
HOURS  
0.00  
43.00

PLAN 1 STATION 14

RATIO	MAXIMUM	MAXIMUM	TIME
C.50	FLOW,CFS	STAGE,FT	HOURS
1.00	34520.	855.5	49.00
	71668.	863.2	49.00

PLAN 2 STATION 14

RATIO	MAXIMUM	MAXIMUM	TIME
C.50	FLOW,CFS	STAGE,FT	HOURS
1.00	34521.	855.5	49.00
	71692.	863.2	49.00

PLAN 3 STATION 14

RATIO	MAXIMUM	MAXIMUM	TIME
C.50	FLOW,CFS	STAGE,FT	HOURS
1.00	34521.	855.5	49.00
	71736.	863.2	49.00

PLAN 4 STATION 14

RATIO	MAXIMUM	MAXIMUM	TIME
C.50	FLOW,CFS	STAGE,FT	HOURS
1.00	34521.	855.5	49.00
	71756.	863.2	49.00

STATION 04230380 OATKA CREEK AT WARSAW, NY

TOTAL D.A. = 41.9 CONTR. D.A. =  
GAGE DATUM = 987.15 FT.

WATER YEAR	ANNUAL PEAK DISCH. CFS	DATE	CODES	HIGHEST SINCE	GAGE HEIGHT OF ANNUAL PEAK, FT	CODE	ANNUAL MAX GAGE HT. FT	DATE	CODE
1964	1410	03-05-64			7.03				
1965	772	04-07-65			5.28				
1966	679	02-11-66			5.04				
1967	1760	09-28-67			7.28				
1968	1150	01-30-68					6.05	06-26-68	
1969	1360	04-19-69			6.53				
1970	1120	04-02-70			5.94				
1971	1100	03-15-71			5.89				
1972	4010	06-23-72		1960	9.75				
1973	1490	12-06-72			6.90				
1974	1120	04-02-74			5.36				
1975	1530	01-29-75			5.74				
• 1976	1580	03-03-76			6.61				
• 1977	2020	09-24-77			7.56				

PEAKS MARKED WITH • NOT PASSED TO LOG PEARSON PROGRAM

CARD IMAGES SENT TO LOG PEARSON PROGRAM LISTED BELOW

OATKA CREEK AT WARSAW, NY	1964-75	-020	1204230380PK	(HEADER CARD)						
1610	772	679	1760	1150	1360	1120	1100	4010	149004230380PK	(DATA CARD)
1120	1630								04230380PK	(DATA CARD)



PGM J407 VER 0.4

RUN DATE 2/23/78

.....  
\* U. S. GEOLOGICAL SURVEY  
\* LOG-PEAKSON TYPE III FLOOD FREQUENCY ANALYSIS  
\* FOLLOWING WATER RESOURCES COUNCIL GUIDELINES  
\* .....

----- NOTICE -----  
| PRELIMINARY COMPUTATIONS |  
| USER RESPONSIBLE FOR ASSESSMENT |  
AND INTERPRETATION

STATION ID: 042303A0 PK

NAME: OATKA CREEK AT WARSAW NY

HIST PER 1960-75

CASE NO 38

INPUT DATA SUMMARY

HISTORIC RECORD 0  
NO. OF PEAKS 14  
SYSTEMATIC RECORD 12  
SCREENING LEVEL DISCHARGES  
GAGE BASE 0.0  
LOW OUTLIER NONE  
HIGH OUTLIER 4000.0

SKED COEFFICIENT  
GENERALIZED -0.200E-01  
OPTION WRC WEIGHTED

NO PEAKS WERE LESS THAN GAGE BASE OF 0.0 CFS.

INPUT DATA FOR PEAKS EXCEEDING GAGE BASE DISCHARGE

WATER YEAR	PEAK (CFS)	WATER YEAR	PEAK (CFS)
1	1610.0	7	1120.0
2	772.0	8	1100.0
3	679.0	9	4010.0
		10	1490.0
		11	1120.0
		12	1630.0

1 HIGH OUTLIERS OR HISTORIC PEAKS ABOVE

3449.99 CFS SPECIFIED BY USER.

U. S. GEOLOGICAL SURVEY  
LOG-WEATSON TYPE III FLOOD FREQUENCY ANALYSIS  
FOLLOWING WATER RESOURCES COUNCIL GUIDELINES

NOTICE  
PRELIMINARY COMPUTATIONS  
USER RESPONSIBLE FOR ASSESSMENT  
AND INTERPRETATION

STATION ID: 04230380 PK NAME: OATKA CREEK AT WATSON NY HIST PLW 1960-75 CASE NO 38

EXCEEDANCE PROBABILITIES OF OBSERVED PEAKS  
USING WEIBULL PLOTTING POSITIONS

WATER YEAR	PEAK (CFS)	EXCEED SYS	EXCEED PROB HIST	WATER YEAR	PEAK (CFS)	EXCEED PROB SYS	EXCEED PROB HIST
4	4010.0	0.077	0.059	11	1120.0	0.692	0.690
6	1760.0	0.154	0.126	8	1100.0	0.769	0.770
12	1630.0	0.231	0.209	2	772.0	0.846	0.850
1	1610.0	0.308	0.289	3	679.0	0.923	0.930

U. S. GEOLOGICAL SURVEY  
LOG-WEATSON TYPE III FLOOD FREQUENCY ANALYSIS  
FOLLOWING WATER RESOURCES COUNCIL GUIDELINES

U. S. GEOLOGICAL SURVEY  
LOG-HEAD-450N TYPE III FLOOD-FREQUENCY ANALYSIS  
FOLLOWING WATER RESOURCES COUNCIL GUIDELINES

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----- NOTICE ----- NOTICE -----
| PRELIMINARY COMPUTATIONS |
| USEN RESPONSIBLE FOR ASSESSMENT |
| AND INTERPRETATION |
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**CASE NO 38**

NO. OF PEAKS TEARS	HISTOMIC RECORD	SYSTEMATIC RECORD
0	12	12
14	12	12

SKEN COEFFICIENT  
GENERALIZED  
OPTION

USE OF 0.0 CFS.

INPUT DATA FOR PEAKS EXCEEDING GAGE BASE DISCHARGE

WATER YEAR	PEAK (CF5)
4	1760.0
5	1150.0
6	1360.0

PEAK (CFS)	Wavelength (nm)	Intensity (a.u.)
1120.0	1120.0	100
1100.0	1100.0	80
4010.0	4010.0	60

WATER YEAR	PEAK (CFS)
10	1490.0
11	1120.0
12	1630.0

3444.99 CF: SPECIFIED BY USER.

264 J-07 VER 0.4

RUN DATE 2/23/75

.....  
\* U. S. GEOLOGICAL SURVEY  
\* LOG-PEARSON TYPE III FLOOD FREQUENCY ANALYSIS  
\* FOLLOWING WATER RESOURCES COUNCIL GUIDELINES  
\*  
.....

----- NOTICE -----  
| PRELIMINARY COMPUTATIONS |  
| USER RESPONSIBLE FOR ASSESSMENT |  
AND INTERPRETATION

STATION ID: 04230390 PK

NAME: OATKA CREEK AT WARSAW NY

HIST PER 1960-75

CASE NO 38

W R C LOG-PEARSON TYPE III CURVE FITTING

HIGH OUTLIERS AND HISTORIC PEAKS TO BE TREATED BEFORE TREATING LOW OUTLIERS.

HIGH OUTLIERS AND HISTORIC PEAKS WERE NOTED.

NO OUTLIERS BELOW ARC CRITERION OF 435.48 CFS.

#### ANNUAL FLOOD STATISTICS

MEAN	SYSTEMATIC	WRC
STANDARD DEVIATION	RECORD	ESTIMATES
SKEN COEFFICIENTS	3.1245	3.1137 S
STATION	0.1965	0.1815 S
GENERALIZED	1.0453	0.9614
WRC WEIGHTED	--	-0.0200
FLOOD BASE (CFS)	0.0	0.0
PROB(PEAK > BASE)	1.0000	1.0000
NUMBER OF YEARS	12	12
PERIOD (YEARS)	12	16

S - SYNTHETIC  
\* ADOPTED FOR FINAL COMPUTATIONS



PGM J407 VER 0.4

RUN DATE 2/23/78

U. S. GEOLOGICAL SURVEY  
LOG-PEARSON TYPE III FLOOD FREQUENCY ANALYSIS  
FOLLOWING WATER RESOURCES COUNCIL GUIDELINES

NOTICE  
PRELIMINARY COMPUTATIONS  
USEM RESPONSIBILITY FOR ASSESSMENT  
AND INTERPRETATION

STATION ID: 04230390 PK

NAME: OATKA CREEK AT WARSAW NY

MIST PER 1960-75

CASE NO 38

LOG-PEARSON TYPE III FREQUENCY CURVES  
CANT CALC EXPCD-PROB DISCHG AT NOMINAL PROB 0.00200. COMRESP PROB ON WRC CURVE IS 8.002E-05

DISCHARGES

EXCEEDANCE PROBABILITY	SYSTEMATIC RECORD	WRC ADJUSTED	EXPECTED PROBABILITY	95% CONFIDENCE LIMIT (ONE-SIDED TEST) LOWER . UPPER
0.9950	638.3	439.3	330.3	232.9 . 611.4
0.9900	658.7	489.5	391.8	272.9 . 866.4
0.9500	739.7	651.8	590.3	417.9 . 837.8
0.9000	803.1	759.8	710.0	521.3 . 952.7
0.8000	906.7	916.3	882.9	675.0 . 1122.3
0.5000	1232.8	1300.9	1300.9	1052.9 . 1608.2
0.2000	1872.0	1847.4	1912.1	1505.0 . 2503.0
0.1000	2443.3	2217.3	2369.6	1764.6 . 3229.2
0.0400	3372.8	2992.2	2996.0	2079.9 . 4274.9
0.0200	4244.9	3050.7	3579.5	2301.0 . 5136.8
0.0100	5298.9	3413.1	4223.2	2515.7 . 6071.4
0.0050	5573.4	3761.7	4766.2	2725.8 . 7077.1
0.0020	6076.0	4261.1	*****	3003.1 . 8526.7

BASIN-CHAR FILE INPUT CARDS --

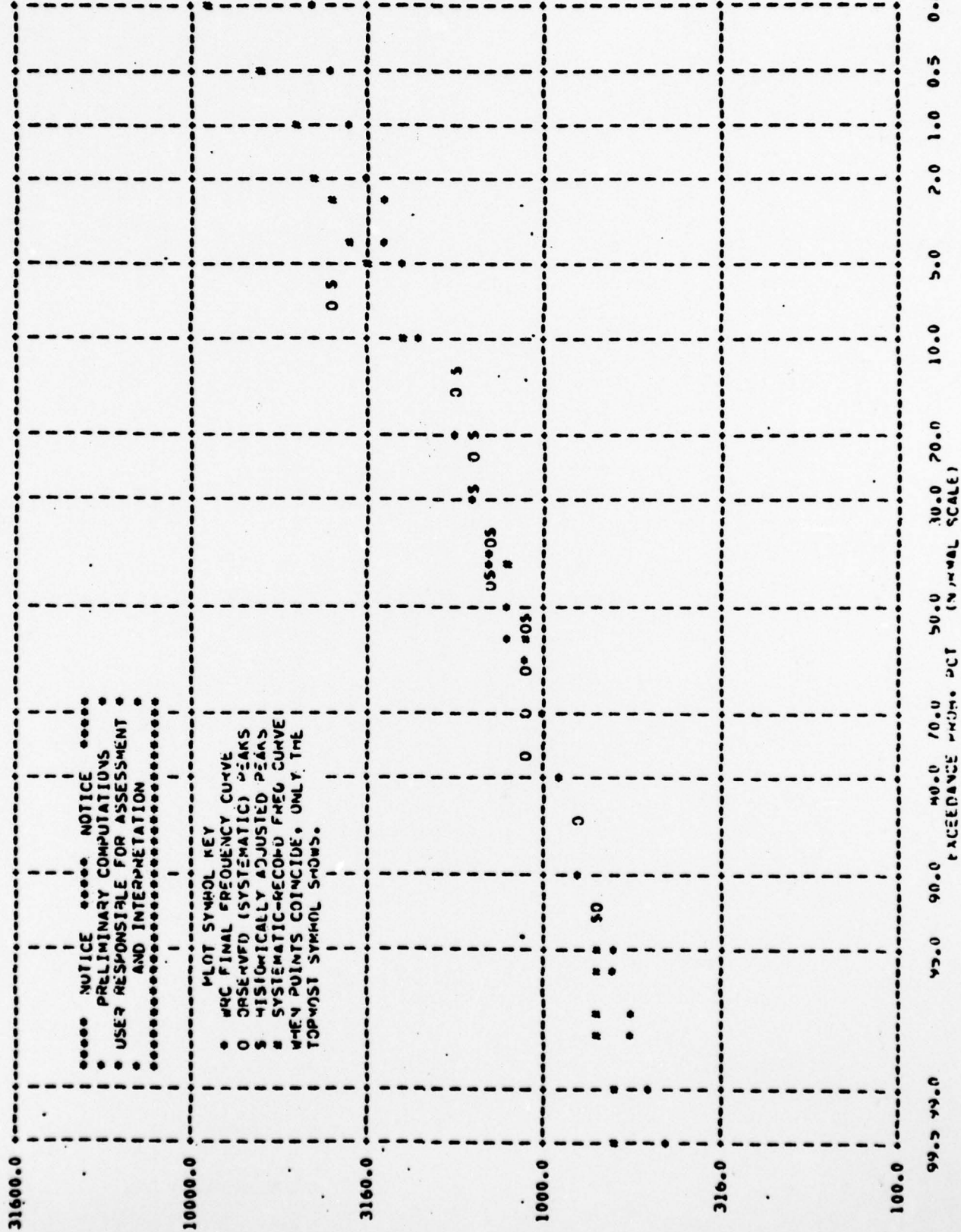
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2 04230390 81 3410 82 3740 83 3125 84 0.149 85 1.045179 4280  
2 04230390179 -0.020140 3.114181 0.161

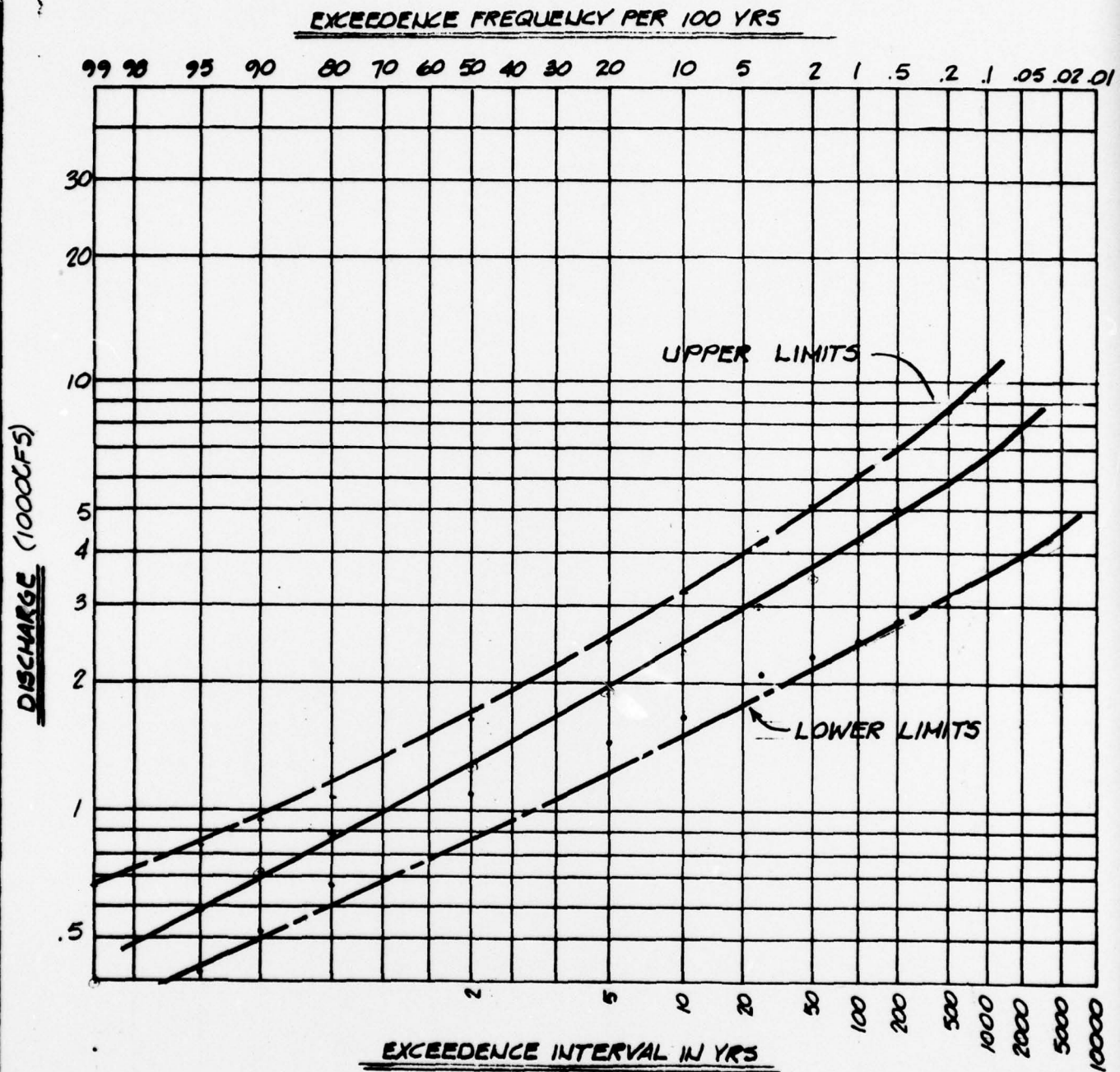
STATION ID: 04230340 PK

NAME: OATKA CREEK AT WARSAW NY

HIST PER 1960-75

CASE NO 38





OATKA CREEK @ WARSAW, N.Y.  
USGS GAGE 04230380 PK

DISCHARGE - FREQUENCY  
CURVE



STETSON • DALE

DATE

8.31.79

DRAWN

JPG

JOB

2305

APP'D

OATKA CREEK  
DAM





STETSON • DALE

BANKERS TRUST BUILDING  
UTICA • NEW YORK • 13501  
TEL 315-797-5800

# DESIGN BRIEF

PROJECT NAME NEW YORK STATE DAM INSPECTION

DATE 8.20.79

SUBJECT OATKA CREEK DAM

PROJECT NO. 2305

STAGE-DISCHARGE

DRAWN BY JPG

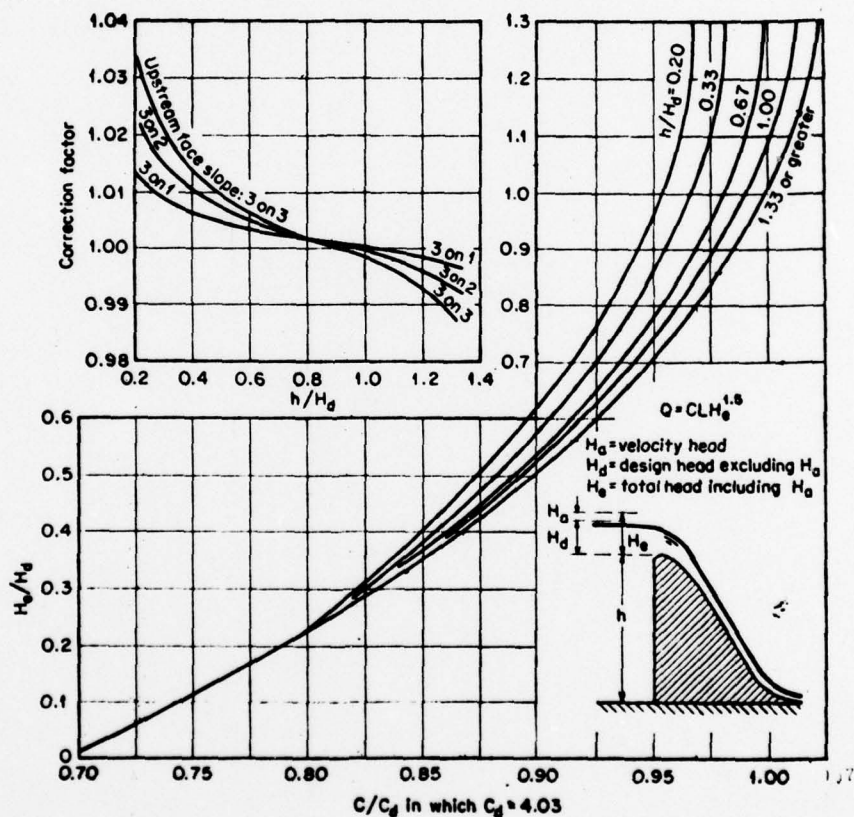


FIG. 14-4. Head-discharge relation for WES-standard spillway shapes.



**STETSON • DALE**BANKERS TRUST BUILDING  
UTICA • NEW YORK • 13501  
TEL 315-797-5800**DESIGN BRIEF**

PROJECT NAME NEW YORK STATE DAM INSPECTION DATE 8.20.79  
SUBJECT STAGE - DISCHARGE PROJECT NO. 2305  
OATKA CREEK DAM DRAWN BY JPG

FREE WEIR FLOW (OGEE SPILLWAY)

SPILLWAY LENGTH - 160 FT

$$h/H_d = 15/5 = 3 \therefore C_d = 4.03$$

TOP OF SPILLWAY = 864.00 (USGS)

HEIGHT OF DAM = 15' (h)

 $H_d = 5'$  (FROM PLAN DTD 3.13.34 SHT 2002)

ELEV	$H_e$	$H_e/H_d$	$C/C_d$	$C$	$Q = C L H_e^{1.5}$
864.	0	0	.0	0	0
866	2	.4	.86	3.47	1570
868	4	.8	.96	3.87	4954
870	6	1.2	1.02	4.11	9665
872	8	1.6	1.03	4.15	15026
874	10	2.0	1.03	↓	20997
876	12	2.4	1.03		27602
878	14	2.8	1.03		34782
880	16	3.2	1.03		42496
882	18	3.6	1.03		50708
884	20	4.0	1.03		59390
886	22	4.4	1.03		68518
888	24	4.8	1.03		78070
890	26	5.2	1.03		88029
892	28	5.6	1.03		98380
894	30	6.0	1.03	4.15	109106

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**DESIGN BRIEF**

PROJECT NAME \_\_\_\_\_ DATE \_\_\_\_\_

SUBJECT Oatka Creek PROJECT NO. \_\_\_\_\_

DRAWN BY \_\_\_\_\_

Discharge under Bridge under low flow (Assumed, estimated)  
 references: Fig. 1-12  
 Design & Construction

Q	Q/W	H/D	H
1400 cfs	20	0.35	4.2'
2800	40	0.52	6.2
4200	60	0.68	8.2
5600	80	0.83	10.0
7000	100	0.96	11.5
8400	120	1.08	13.0
9800	140	1.22	14.6
11200	160	1.36	16.3
12600	180	1.54	18.5
14000	200	1.7	20.4
15400	220	1.9	22.8
16800	240	2.17	26.
18200	260	2.3	27.6

For flows under about 22,000 cfs critical, etc. governs. For higher flows pressure the would govern. However for heads H above about 19', water would also be flowing over the bridge.

For flows above ~7700 cfs the spillway will be submerged at H=29'

For flows above ~13,000 cfs the bridge will be overtopped

The forewater rises higher than the water on the bridge. The water on the bridge is static and is the normal water level.

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PROJECT NAME \_\_\_\_\_ DATE \_\_\_\_\_

SUBJECT Oatka Creek PROJECT NO. \_\_\_\_\_

DRAWN BY \_\_\_\_\_

Discharge under Bridge  
Assuming Low Water

FOR Concrete Box Culverts with square-cornered entrance

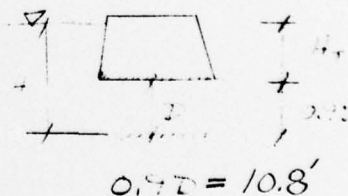
$$C = \left( 1 + 0.4 r^{0.3} + \frac{0.0045 L}{r^{1.25}} \right)^{-1/2}$$

1:57'

$$r = \frac{A}{P} = \frac{70'(12')}{2(70'+12')} = 5.12'$$

$$C = 0.77$$

$$Q = CA \sqrt{2g H_T}$$



Q	H <sub>T</sub>	H
20,000	14.8'	25.6
30,000	33.4	44.2
40,000	59.4	70
50,000	92.8	103.6
60,000	133.6	144
70,000		
80,000		
90,000		



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# DESIGN BRIEF

PROJECT NAME \_\_\_\_\_ DATE \_\_\_\_\_

SUBJECT \_\_\_\_\_ PROJECT NO. \_\_\_\_\_

DRAWN BY \_\_\_\_\_

Head - Igarine  
Curve for Bridge  
Center - just below  
Ontko Creek Dam. n.  
teray

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Therapeutic (1000 lbs)

Head (24)



APPENDIX D  
STABILITY ANALYSIS

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**DESIGN BRIEF**PROJECT NAME CATKIN CREEK DAM, CROTON, N.Y.

DATE \_\_\_\_\_

SUBJECT STABILITY ANALYSIS -

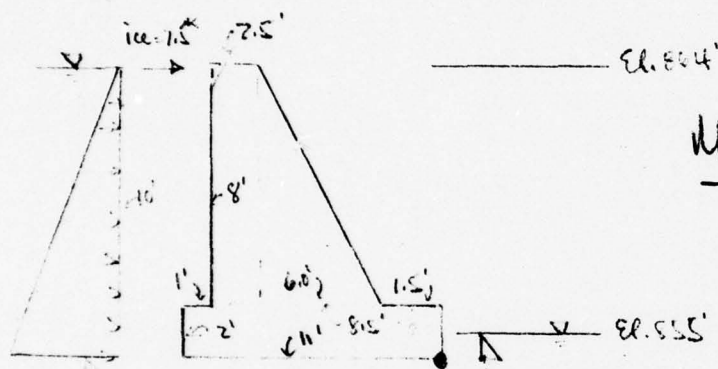
PROJECT NO. \_\_\_\_\_

OVERTURNING & SLIDING

DRAWN BY \_\_\_\_\_

Analysis Section - Section D-D Adjacent to Gate House

Normal Operations Condition

 $M_{ke}$  resisting overturning due to mass of dam

$$= (2 \times 11 \times 1.5 \times \frac{11}{2}) + (\frac{1}{2} \times 8 \times 6 \times 1.5) (1.5 + \frac{2 \times 6}{3})$$

$$+ (2.5 \times 8 \times 1.5) (7.5 + \frac{2.5}{2}) =$$

$$= 15.1 + 19.8 + 26.2 = \underline{64}^k$$

$$p = \frac{62.4 \times 10}{2} = 312 \text{ ksf}$$

$$q = .06 \text{ ksf}$$

$$\text{uplift force} = (\frac{62.4 + .06}{2} \times 11) = 376^k$$

$$\text{Wt. dam} = 3.3 + 3.6 + 2 = \underline{9.9}^k$$

$$M_{ke} \text{ causing overturning} = (\frac{0.624 \times 10}{2} \times \frac{10}{3}) + \left[ (\frac{.06 \times 11 \times 11}{2}) + (\frac{.624 \times 4}{2} \times \frac{2 \times 11}{3}) + (7.5 \times 9) \right]$$

$$= 10.4^k + (3.6 + 22.8)^k + 67.5^k = \underline{104.3}^k$$

$$FS \text{ against overturning} = \frac{64^k}{104.3^k} = \underline{0.62}$$

Position of resultant is outside of base dimensionsFS against sliding (friction-shear method, using 100 psi bond/shear and  $\mu = 0.65$ )

$$FS = \frac{(0.65)(9.9 - 376^k) + (1.0 \times 104 \times 11)}{(\frac{1}{2} \times 10 \times 62.4) + (7.5)} = \frac{162}{10.6} = \underline{15 \pm}$$

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TEL 315-797-5800**DESIGN BRIEF**

PROJECT NAME Oatka Creek Dam DATE \_\_\_\_\_  
SUBJECT \_\_\_\_\_ PROJECT NO. \_\_\_\_\_  
DRAWN BY \_\_\_\_\_

Normal operating conditions without ice

$$M_{\text{tot}} = 104.3'K - 67.5'K = 36.8'K$$

$$M_R = 64'K$$

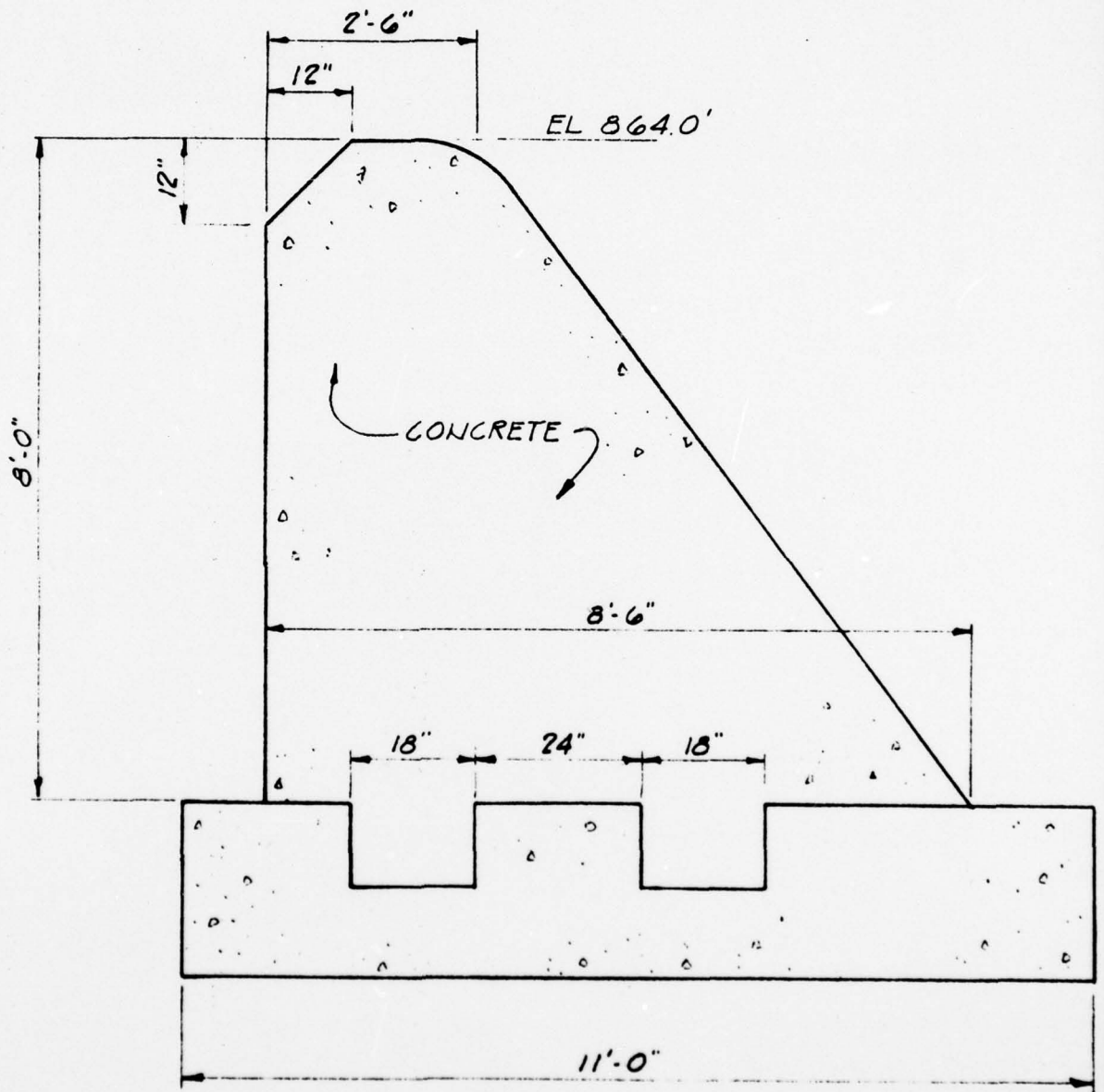
$$F.S. \text{ against overturning} = \frac{64}{36.8} = 1.74$$

Position of resultant (from toe)

$$= \frac{\sum M}{\sum V} = \frac{64 \cdot 36.8}{99K - 3.76K} = 4.4' = 0.4b \text{ from toe}$$

inside middle  $\frac{1}{3}$

$$F.S. \text{ against sliding} = \frac{162}{10.6 - 7.5} = 52 \pm$$



# OATKA CREEK DAM

NO SCALE



STETSON • DALE

DATE

9.14.79

DRAWN

JPG

JOB

2305

APP'D

STRUCTURAL  
ANALYSIS



APPENDIX E  
REFERENCES

## APPENDIX

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